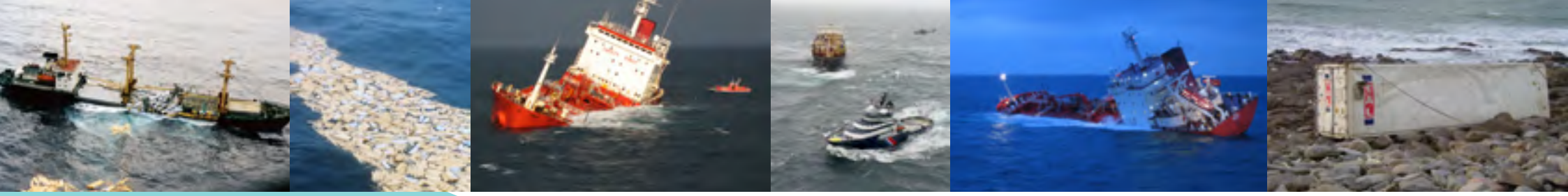

The risk of marine pollution in the Channel

Channel Arc Manche integrated strategy

November 2013

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Photo credits: French Navy, P. Blumerel, D. Basse

Printed in November 2013

This document has been produced as part of the "Maritime Safety" working group of the CAMIS project, co-financed by the ERDF within the framework of the European cross-border cooperation programme Interreg IVA France (Channel) - England and led by Haute Normandie region.

Vigipol

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Editorial

Consequence of the fire aboard the *MSC Flaminia*

Since the 1960s, the Channel has been the scene of pollution and other maritime accidents whose names are engraved in our memories: *Torrey Canyon, Amoco Cadiz, Tanio, Ievoli Sun, Tricolor, Ece, MSC Napoli*, etc. without any area of the Channel area being truly spared. The absence of any significant events at sea in recent years is probably due to preventive measures and maritime traffic supervision resources deployed in the area. But has the risk completely gone away for all that?

At regular intervals, ships continue to be grounded, collide, catch fire and sink, sometimes causing many casualties among the crew and passengers. But these accidents most often occur far from our shores. The media, besides the specialised press, are content with recounting them in snippets without the public being aware of the consequences. And without proper coverage, it is difficult to maintain vigilance and commitment of the maritime community and elected representatives on the coast in order to better protect humans at sea, coastal populations and the marine environment. In addition, the international economic situation tends to push in favour of reducing investment for the prevention of maritime accidents.

Although the Channel has not experienced catastrophic pollution in recent years, looking back at some recent accidents is hardly reassuring, in light of the consequences they could, potentially have had. On 14 July 2012, a container exploded in the central part of the *MSC Flaminia*, causing a massive fire aboard and killing three of the crew. At the time, the container ship, with its cargo of 2,870 containers, was sailing in the North Atlantic towards Europe. The crew abandoned the drifting ship. It took the SMIT Salvage company, assigned by the ship's owner, several weeks to extinguish the fire, reduce its list and start to tow the vessel to European waters. During this period, the threat of further explosions, the difficulty in controlling the fire, the carriage of dangerous goods and the lack of on-board evaluation before 6 August, prevented French and British authorities from implementing a procedure to find a place of refuge. Indeed, a port or refuge procedure assumes accurate knowledge of the risk to avoid endangering people and coastal assets and activities. This misunderstanding sparked a controversy, especially among marine and environmental protection groups. On 15 August, Germany announced its willingness to accommodate the ship in one of its ports. In late August, after an inspection conducted by an international team, France, Britain, Belgium and the Netherlands allowed the ship to pass through their territorial waters and the vessel arrived at Wilhelmshaven on 9 September. This example illustrates the safety and environmental shortcomings of the transportation of dangerous goods in containers. The operator's inability to provide timely and accurate information about the nature of the dangerous goods and the location of hazardous containers and the salvage company's difficulty in controlling the fire on board delayed decision-making by the maritime authorities. The initial explosion occurred far off the coast making it possible to keep the ship out at sea. But what if it had happened in the middle of the Channel? And in particular in the Dover Strait, in a port's standby area or near a sensitive or valuable coastline?

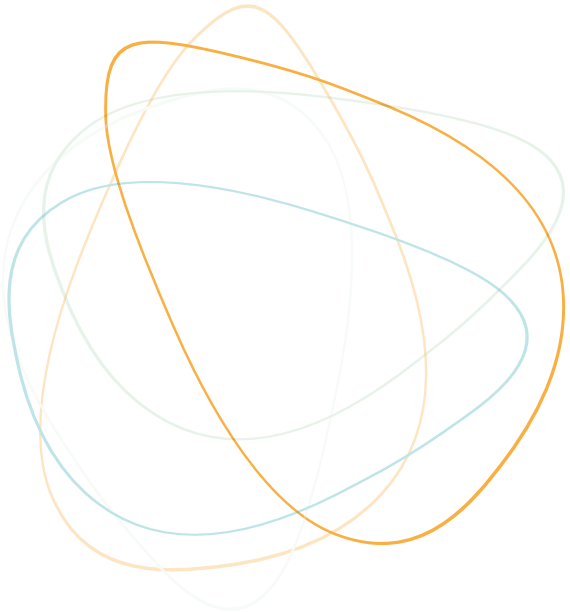
TRUE OR FALSE?

Managing marine pollution is the prerogative of the State, not local authorities.

Measures to fight marine pollution and management of large-scale land pollution are the responsibility of the State in France. In the United Kingdom, the UK Government has responsibility for dealing with marine pollution, once pollution is ashore it is the within the powers of local government to coordinate a clean-up. That is to say local authorities are necessarily mobilised and involved in managing the crisis. This is especially the case when small pollution, statistically the most likely to occur. Not being prepared to deal with pollution would be a prejudicial error for the territory, especially as no area in the Channel is really spared this risk.

This document proposes, in summary form, to **highlight risks, issues and tools available to fight maritime pollution in the Channel.** Possible areas for improvement are also recommended. The goal is to **educate elected representatives in the coastal area and maritime and land authorities about the need to work together to prepare for the management of large-scale, complex and potentially dangerous events for human life, both at sea and on the coastline.**

Contents



What is maritime pollution?

The first image that comes to mind when talking about maritime pollution is often that of an oil slick. However, while oil spillage at sea is still a real threat, it is not the only one. In view of the variety of goods transported by sea in the world, any type of product is liable to be discharged into the marine environment, from the most innocuous to the most dangerous chemical product. However, compensation for victims, as envisaged in international agreements, is based on the **concept of "pollution damage"**, hence the importance of knowing what is behind this expression.

From a legal point of view

There is no single and exclusive definition of pollution when the term is associated with the adjectives *marine* or *maritime*. The only reference framework in this area is the definition used in Article 1.4 of the UN Convention on the Law of the Sea, known as the 1982 Montego Bay Convention (see Focus opposite). The MARPOL convention 73/78 dedicated to sea pollution talks about the protection of the *marine environment* against all forms of pollution caused by the discharge of harmful substances from vessels**.**

From an operational point of view

A change of perspective... The aim is no longer to set a standard or define what is called "maritime pollution" but to manage pollution both at sea and on land. Although pollution implies harmful substances, it includes all types of hydrocarbons and potentially hazardous & noxious substances (HNS). But these products are not the only ones discharged by vessels. **As the vast majority of manufactured goods are transported by sea, spills of any kind are liable to reach the coast.** Since the 1960s, the shores of the Channel have been the scene of atypical discharging on the coast: detonators, millions of Lego parts, pineapples, motorcycles, cosmetics, tobacco, whisky, etc. And these discharges, whether defined as pollution or not in contingency plans, should indeed be managed and cleaned by the authorities who have the responsibility for countering or removing pollution, even if in some cases, people do not hesitate to lend a helping hand, not without serious problems (with unauthorised salvage, reported by the media as looting, on the coast of Devon in the case of *MSC Napoli* in 2007). Finally, another source of hidden maritime pollution is sometimes deferred in time and arrives decades later: the dumping of wrecks due to corrosion. The Channel is littered with wrecks of various ages (many dating from the Second World War in particular) where this type of delayed-reaction pollution sometimes occurs (see Example opposite).

Beach polluted by *the Amoco Cadiz* oil spill in 1978

Marine pollution or maritime pollution?

Depending on the people involved and the object in question, either phrase is used. *Marine* is more focused on the environment, the element (marine or oceanic), or on the whole, comprising seawater and living elements and energies therein. The term *marine* associated with *pollution* therefore designates pollution affecting the marine environment. The adjective *maritime* on the other hand is used to describe an activity, use, human or artificial intervention, for specific purposes. The expression *marine pollution* therefore expresses a biologically focused approach whereas *maritime pollution* is used to describe an anthropologically focused approach with direct or indirect human cause of the pollution in question.

FOCUS

Definition of the Montego Bay Convention

The term *m*arine pollution means direct or indirect introduction by humans of substances or energy into the marine environment, including estuaries, which results in or may have adverse effects such as:

- ➔ damage to living resources and marine fauna and flora
- ➔ risks to human health
- ➔ hindrance to maritime activities, including fishing and other legitimate uses of the sea
- ➔ alteration of the quality of seawater in terms of its use
- ➔ and degradation of amenities

EXAMPLE

The Peter Sif

In November 1979, the container ship Peter Sif sank off Ouessant with nearly 400 tonnes of oil on board. Sealing work was undertaken to prevent leakage. Pumping and blasting of the wreck were considered but abandoned because they were deemed too expensive for the former and too risky for the latter. In 1998, due to corrosion, leaks were observed in the vicinity of the wreck and new salvage work was conducted. There were more leaks in 1999, 2003 and 2006. A major operation enabled the remaining 160 tonnes to be retrieved. In March 2007, operations were completed and the risk was considered to be finally ruled out, 28 years after the sinking.

What are we talking about?

What are the risks induced by maritime traffic?

A confusion between **maritime or marine risk** and coastal risk often occurs. This confusion alters perception of the risk and therefore the means to effectively prepare against it at all levels. Risk is the combination of a hazard and a vulnerability. On the one hand, maritime risk is composed of hazards (damage, explosion, weather conditions, traffic density, etc.) and the vulnerability of ships (experience of the crew, cargo type, age and maintenance of the ship, etc.). On the other hand, the **risk of coastal pollution** consists of a hazard (pollution from the sea) and the vulnerability of the affected area (defined by the issues, resilience and the perception of a area). There must therefore initially be a maritime accident with pollution before it affects the coast.

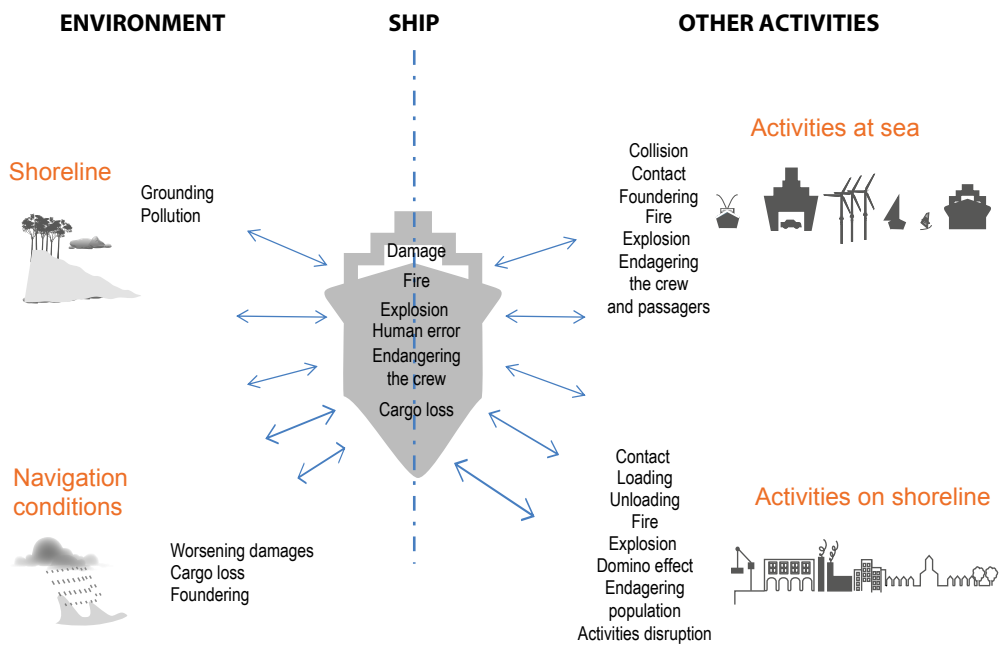
To better understand these chain reactions, the Figure opposite illustrates the risks involved inherent in maritime traffic in terms of causes and potential consequences. Firstly, **a ship has risk associated with it** including structural damage, fire, explosion, human error, endangering the crew; these factors may interact, amplify and worsen each other. In addition, the ship is **in constant interaction with its environment**: the coast, shallows, reefs and **navigation conditions** (wind, waves, fog) that may cause loss of cargo or aggravate damage, sometimes leading to sinking. The tipping point between a serious offshore event and a maritime disaster is often reached with weather or sea conditions at the time. Thus, some events could have turned into a disaster but the ships were able to stay on course or be towed because the weather was clement. Conversely, accidents without great initial severity become critical because of difficult sea conditions.

Interaction of the ship with its environment and also with other sea and onshore activities. Traffic density and maritime activities in the Channel amplify the risk of collision, fire or explosion and of endangering people. Finally, on land, the causes of maritime pollution are collision (when a vessel strikes a fixed installation: dock, buoy, etc.), problems occurring during the loading and unloading of goods, the risk of a domino effect caused by fire or explosion and the risk of endangering people.

Public or private stakeholders in the maritime world have worked over the decades to reduce these risks through three types of measures. **Preventive measures** aimed at reducing the frequency of accidents at sea.

Preparedness measures seeking, in turn, to limit the harmful consequences of an accident when it occurs, that is to say, measures to be taken when everything is going well in order to better manage a crisis when it occurs (emergency plan, training, crisis exercise). **Reparation measures**, finally, aim to improve compensation for victims of pollution.

The risks incurred by maritime transport



TRUE OR FALSE?

Double-hull tankers are safer

In the short and medium term, the decision to decommission the old single-hull tankers helped anticipate the renewal of the global fleet and therefore improve it. For the long term, we must remain vigilant because the double hull of construction is not flawless; there are greater difficulties in inspecting and maintaining ballasts; there are explosion risk in these areas, loss of buoyancy, more complex refloating and towing in case of damage to the hull, unlined machinery area, etc..

What are we talking about?

Maritime pollution in the Channel since the 1960s

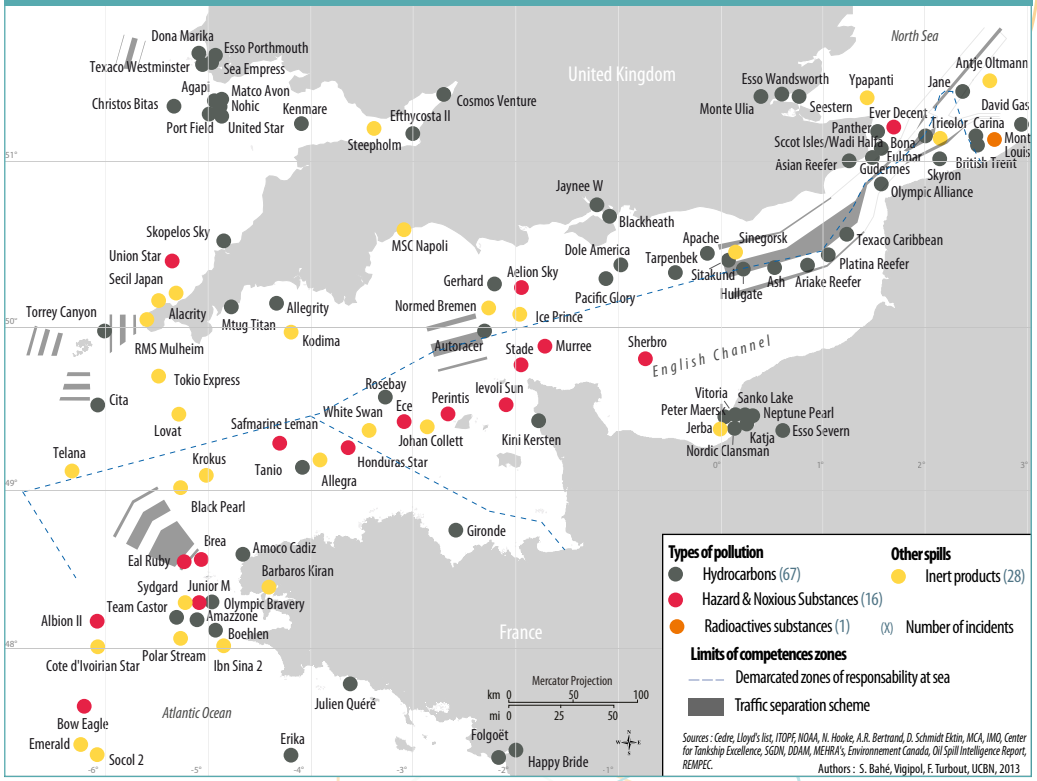
112 accidental spills of varying product types and scales (see map opposite) were identified **in the Channel and its approaches between 1960 and 2009**, including 84 cases of pollution (that is to say, spills of hazardous or potentially hazardous substances). The Channel was the scene of two of the world's major oil spills: the *Torrey Canyon* and the *Amoco Cadiz*.

No sector of the Channel is truly out of harm's way. The presence of pollution is high throughout the area. Some areas, however, concentrate more pollution than others. This is particularly the case of the TSS (Traffic Separation System) of Ouessant, Les Casquets and the Pas de Calais. This finding is not surprising since TSSs were established by the IMO at the end of the 1960s to reduce the risk of collision in a region where maritime traffic is heavy in both directions, and in areas where significant shipping paths cross over. The approaches of several major ports (Le Havre and Milford Haven in particular) and some estuaries (the Seine and the Thames in particular) also have a higher occurrence of pollution.

More specifically, pollution by potentially hazardous or noxious substances are mainly located near the rail track at Les Casquets and off the tip of Bretagne while spills of inert products are mainly concentrated on the western entrance of the Channel between southern Cornwall and northern Brittany. One spill of radioactive substances, the *Mont Louis,* occurred in the Pas de Calais TSS in 1983. No zone in the Channel is truly out of harm's way. That said, the highest density of accidents has occurred in the entrances to the main ports or estuaries and around traffic separation schemes (TSS), and these areas can therefore be considered particularly at-risk.

Whilst some pollution is naturally degraded at sea, some becomes is broken up by the seas action or dissolved and some is salvaged, it often persists 'hidden' to many observers. However, some regions (Bretagne, Cornwall and Devon in particular) have had unwanted and untimely direct reminders of the risks with pollutants manifesting themselves on shore. The recurrence of pollution has generated greater awareness of the risk of pollution among residents and elected representatives of those areas, encouraging them to be prepared (by uniting around Vigipol in Bretagne, for example). Other regions of the Channel, although so far spared, also need to prepare because they are equally at risk of pollution as their neighbours west of the Channel.

Accidental pollution occurring in the Channel (1960-2009)



EXAMPLE

The Torrey Canyon

On 18 March 1967, the Liberian tanker ran aground between the Scilly Isles and the British coast with 121,000 tonnes of crude oil on board. The successive waves of pollution affected both the British and French coasts. This was the first major oil spill in history. It was to be the starting point for British, French, European and global maritime pollution prevention and action policy. This example also illustrates the fact that pollution discharged into the Channel may affect both shores and reinforces the need for cooperation between the two countries.

FOCUS

Illegal discharges

Non-accidental offshore hydrocarbon emissions resulting from maintenance operations are not all illegal. They are allowed when their hydrocarbon concentration does not exceed 15 ppm (parts per million) and outside specific areas including the Channel. Regular cleaning of tanks is an essential operation for the proper functioning of tankers. But contaminated water must then be discharged at port. As a result of a hard crackdown policy, the number of violations in the Channel has been divided by five over the past ten years.

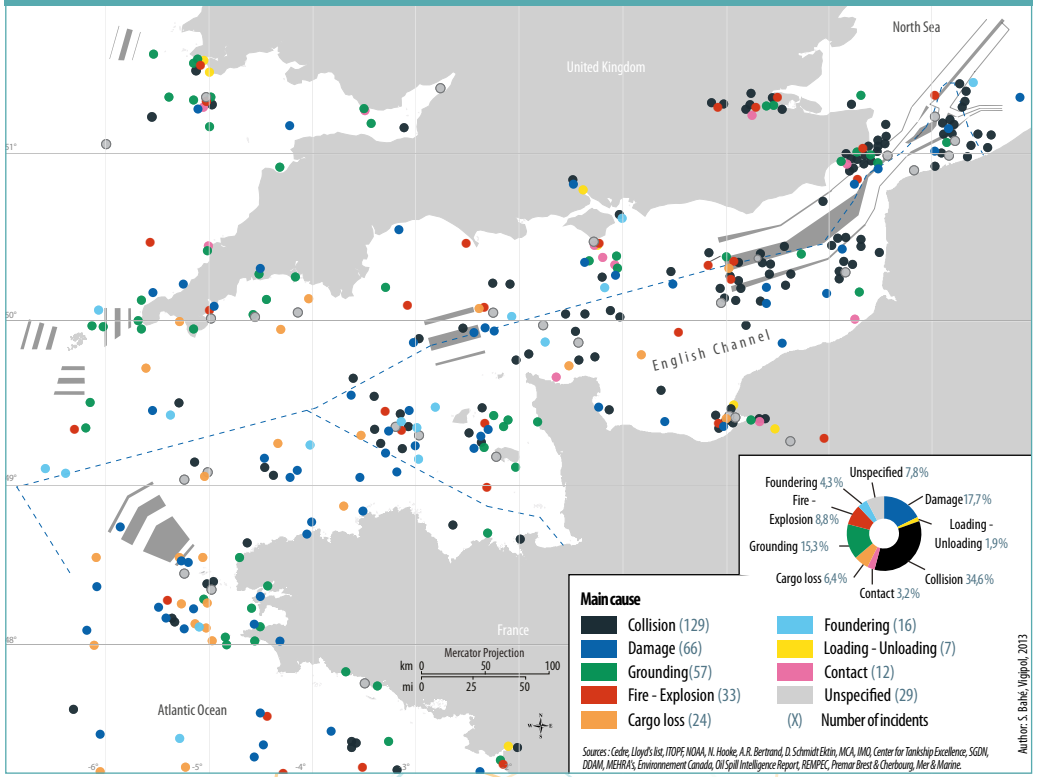
Maritime accidents in the Channel

373 serious maritime accidents were reported in the Channel and its approaches between 1960 and 2009 **(seven per year on average)**. Admittedly, given that 430 ships enter or leave this stretch of sea each day, the total number of accidents recorded seems low by comparison. These accidents include pollution and accidental spills, sinking not causing pollution whether the wreckage has been raised or not and serious accidents that could have gone wrong.

All of these accidents have been classified according to their main cause (see map opposite): damage, incident during the loading or unloading of cargo at the port, collision (with another ship), contact (when the vessel strikes a fixed object. dock, bridge, etc.), undocking of cargo, fire or explosion, sinking and other.

This breakdown of sea events presented per cause shows that there are **areas more prone to certain types of accident**. In the Pas de Calais TSS, they are mainly due to collisions, which is easily explained by the density of maritime traffic and the narrowness of the area. The tip of Bretagne is more conducive to damage and undocking of cargo because of difficult navigation conditions prevailing there. Many ships are wrecked on the coasts of Cornwall while ships tend to sink more often in the Les Casquets TSS. In addition, sea events occur throughout the year even if the autumn, winter and spring storms are often an aggravating factor that will transform the incident into an accident or pollution.

Causes of maritime accidents occurring in the Channel (1960-2009)



EXAMPLE

The Tricolor

In December 2002, this container ship collided and sank within a few minutes 30 m deep in the Dover Strait. It was loaded with 2,862 cars, 77 containers and 1,990 tonnes of heavy fuel oil. The wreck lay on the sea bottom, listing, appearing at the water level at low tide, representing a hazard to shipping and a potential source of pollution. The wreck was lightened, cut up then raised. During operations, a major beacon system was deployed around the wreck. Despite that, two ships collided with it but a hundred or so accidents were avoided. This emblematic example illustrates the risk of over-accidents in dense maritime traffic areas and the specificity of the Strait, which is narrow and shallow.

The wreck of the *Tricolor*

EXAMPLE

A bad day

On 7 December 2007, in very bad weather off the tip of Bretagne, nine ships experienced a serious incident within a few hours, most causing loss of cargo at sea: *Honduras Star* (9 fruit & vegetable containers) *Krokus* (several trucks), *Polar Stream* (6 fruit containers), *Gilbraltar Golden Isle* (2 yachts), *Phantom* (187 batches of wooden planks), *Stropus* (serious damage), *Normed Bremen* (1 man overboard + several stainless steel cylinders each ten metres or so long), *Marie Delmas* (3 cocoa containers) and the *Emerald* (2 banana containers).

How does maritime accidentology evolve?

Over the decades (see map opposite), the frequency of hydrocarbon pollution has fallen sharply thanks to **measures that have been taken to prevent accidents and prepare for the fight against pollution**: setting up of three traffic separation systems (TSSs), surveillance of maritime traffic by the CROSS and MRCC centres, creation of the Manche-plan, towing and procedures for accommodating ships in difficulty, joint Franco-British exercises, etc. In addition to these are **European measures** (setting up of the European Maritime Safety Agency, strengthening of ship inspection rules, stronger cooperation between Member States, etc.) and **international measures** (compulsory reporting of hazardous products transported in TSSs, crew safety, etc.).

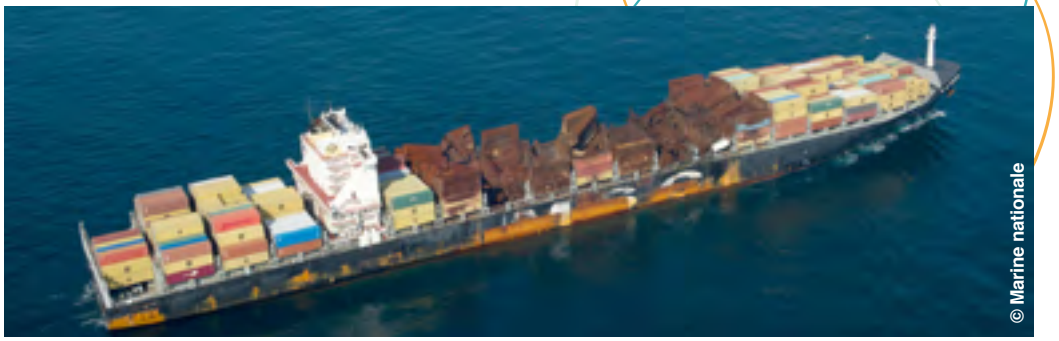
Despite the reduction in the risk of hydrocarbon spillage at sea, the risk of maritime pollution remains. The 1980s saw the appearance of pollution by noxious or potentially hazardous substances (HNS - hazardous & noxious substances) followed in the 1990s by pollution by inert products such as wood or a multitude of diverse and varied non-hazardous products that container ships can transport. **Each type of pollution calls for different management approaches and constant adaptation by the sea and land authorities.** Hazardous and noxious substances (HNS) are undoubtedly the most worrying type for the years to come. A maritime accident - beyond saving the lives of crew members - will swiftly have major consequences for the health of coastal populations, the environment and the economic activities in the whole of the area. This shows that **the risk of accidental maritime pollution is not falling, but changing and becoming more complex.**

Finally, the evolution of ships also modifies the "maritime pollution" hazard. Indeed, giant container ships contain more oil required for their propulsion than small tankers. The risk with this type of vessel is multiple pollution where, for the same event, several types of pollution or spills will need to be managed simultaneously, thus increasing the complexity of operations.

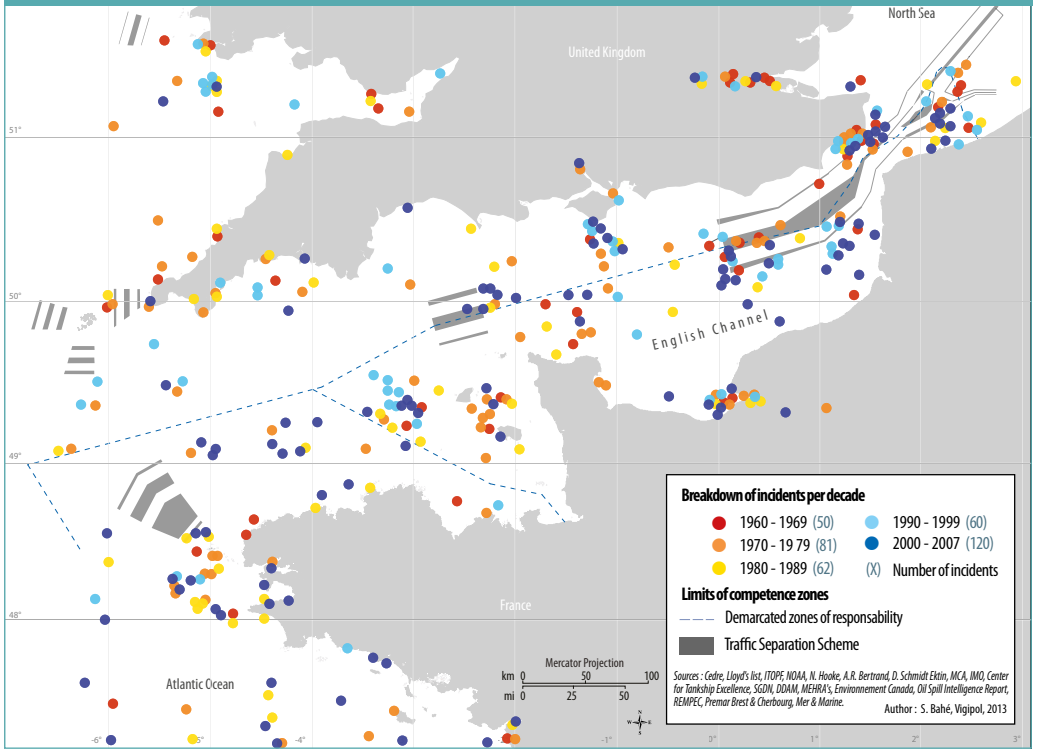
FOCUS

TSSs

Traffic Separation Systems (TSSs) were established by the International Maritime Organisation (IMO) to reduce the risk of collision in areas where maritime traffic is particularly heavy in both directions, especially in narrow zones (straits, capes, etc.). The first TSS was established in the Dover Strait in 1967. Two other TSSs were added to it in the Channel: the Ouessant TSS off Bretagne and Les Casquets TSS off Le Cotentin. Within these systems, shipping is regulated by separate traffic lanes and ship reporting is mandatory.


© Marine nationale

Breakdown of maritime accidents occurring in the Channel per decade (1960-2009)



Maritime traffic density

Global maritime traffic trends

Over recent decades, globalisation has led to an exponential rise in international trade, even if a slight decrease is observed since 2008 due to the economic crisis. Maritime transport plays a dominant role in this regard, accounting for 90% of total tonnage traded, i.e. 6 billion tons a year. **70% of world maritime traffic is ensured by just 14% of ships: container ships.** Port authorities have thus invested heavily to be able to unload an ever greater volume of containers from ever larger ships within ever shorter timeframes.

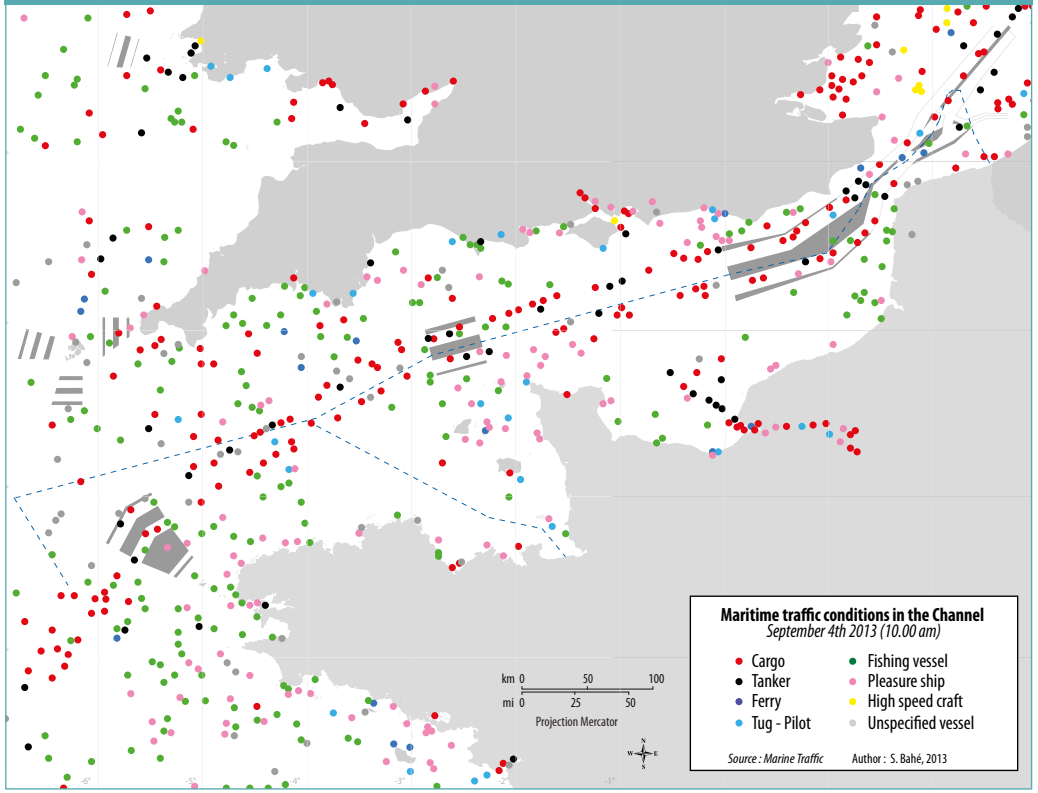
This race for investments has divided ports into two categories: those that can accommodate all types of ships, and those that have not had the technical or financial capacity to adapt to the container. The latter have become regional ports that are both reliant on and intermediaries of large ports.

The Channel ports

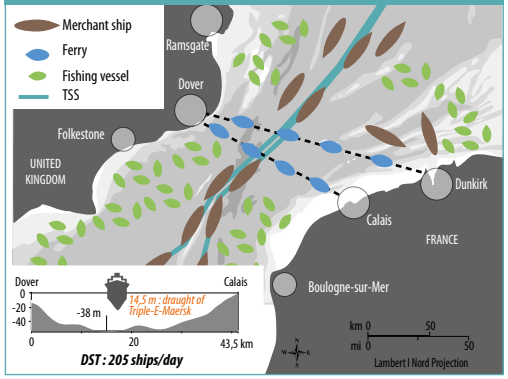
90% of trade external to Europe and almost 40% of its internal trade is carried out by sea. The large commercial ports (Rotterdam, Antwerp, Hamburg, Bremerhaven, Zeebrugge, Le Havre, Dunkirk and Southampton) capture the bulk of maritime traffic – in volume and value – and accommodate ships that carry out cross-continental links. Regular coaster links then run services to the other European ports. This results in a steep rise in Channel traffic, especially since these ships – chartered on demand – often leave empty once the goods have been unloaded.

The Channel's geographic location means that it is an unavoidable corridor towards the North Sea, and therefore **one of the world's busiest maritime corridors**, where almost 20% of the world's maritime traffic passes through. Cargos, container ships, oil tankers and chemical tankers cross the Channel incessantly, connecting the inbound and outbound lanes of the three traffic separation schemes (TSS) criss-crossing the space to channel the flow of ships and limit the risk of collision. In addition to this very heavy longitudinal traffic, there are 132 daily north-south links between French and British ports. In the midst of these freight and passenger flows, 4,200 fishing vessels and aggregate extraction vessels work across the area, crossing paths with scores of yachts, which only serves to make the maritime traffic even heavier (see map opposite).

Snapshot of maritime traffic in the Channel



Specific features of the Dover Strait



In the Dover Strait, an undeniable bottleneck barely 43 km wide, saturation of the area is even more critical (see figure opposite). 69 daily links between the ports of Calais and Dover, loaded with 3,753 freight vehicles per day on average, transport a third of the goods traded between the continent and British Isles, thus perpendicularly cutting across the 205 daily commercial vessels on average that travel between the Channel and North Sea.

Intensity of maritime activity

Despite the intense maritime traffic criss-crossing the Channel, only a small proportion of this actually anchors at its ports. In 2010, 333.4 million tonnes of freight were thus transported via the area's ports and 33.2 million passengers crossed the Channel (see map opposite).

Freight transport is mainly concentrated in the ports of Le Havre, Dunkirk, Southampton, Calais, Rouen and Dover. There are major disparities in terms of tonnage transported between ports, and these stem from both the type of goods transported and the specialities of these ports. The goods transported are mainly gas and petroleum products. Containers (44.3 million tons) and Ro-Ro traffic (94 million tonnes) need to be added to this. Solid bulk cargo is dominated by cereals and agricultural products.

The Channel area ports are also **passenger ports**. Some 45,000 people on average cross the Channel every day. More than 70% of these passengers pass through Dover and Calais, with the Dover-Dunkirk and Portsmouth-Caen lines proving the next most popular. On average, 132 ferry rotations take place on a daily basis on the twelve regular cross-Channel lines. Many of these are concentrated around the Strait where the fierce competition has created a make-or-break situation for companies depending on the economic situation. Traffic is steadily picking up in the Channel Tunnel, with 10.6 million passengers and almost 13 million tons of freight passing through in 2011 – with no real threat to maritime traffic.

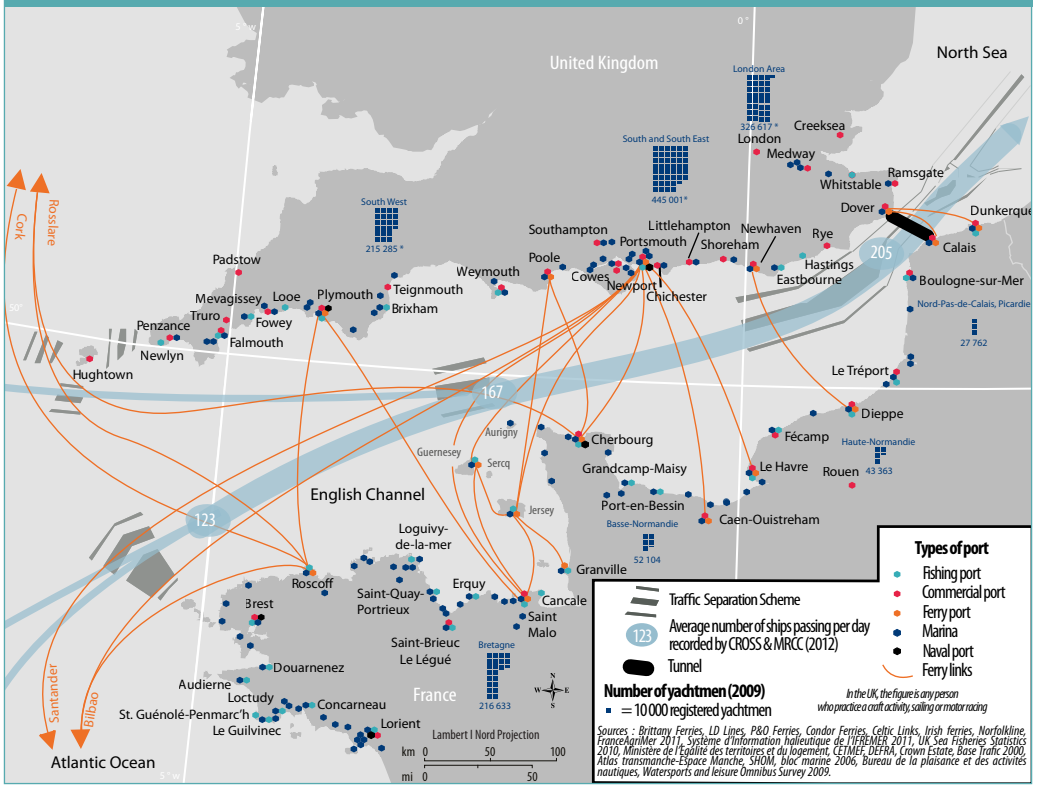
With almost 9,800 crew aboard some 4,200 vessels, **fishing** continues to be a key activity for the local economy, even though it has undergone incessant restructuring and downsizing over the last 40 years. 60% of all the fishermen in the area work in the Channel and 40% fish in the open sea. Although there are more French seamen than British seamen, this is primarily because the type of fishing practised is different. The Channel is still home to a wealth of diverse species. From Penzance to Dover and from Concarneau to Dunkirk, some 210,000 tonnes of catches are sold every year in the 35 fish markets in the area. Boulogne is the largest fishing port in the Channel area with 28,000 tons of fish and crustaceans sold in 2011. In England, Plymouth is the leading fishing port with almost 14,000 tonnes of catches. That said, some species are more profitable than others and sell for more money for the same amount fished. Scampi, monkfish (anglerfish), sea bass, sole and scallop shells are among the most profitable species.

With regard to **yachting**, there are 126 ports equipped with fixed mooring facilities along the Channel coastlines, in addition to the myriad free moorings using the natural shelters of the coast. However, the number of moorings is not enough given the growing number of registered boats, despite the fact that most of these only head out for a few days every year on average. More than 1.3 million boats are thus registered in the area, 3/4 of which on the English side. But while there are more vessels on the English side, France has more ports – particularly in Basse-Normandie and Bretagne. These are major tourist attractions for countless coastal municipalities. The Channel is therefore one of the world's top yacht basins.

Saint-Valéry-en-Caux marina, Haute-Normandie, France

© Paul Tuffereau

Maritime activity in the Channel



Sources : Brittany Ferries, LD Lines, P&O Ferries, Condor Ferries, Celtic Links, Irish Ferries, Norfolkline, FranceAgriMer 2011, Système d'Information halieutique de l'IFREMER 2011, UK Sea Fisheries Statistics 2010, Ministère de l'Egalité des territoires et du logement, CETMEF, DEFRA, Crown Estate, Base Trafic 2000, Atlas transmanche-Espace Manche, SHOM, bloc marine 2006, Bureau de la plaisance et des activités nautiques, Watersports and leisure Omnibus Survey 2009.

Why such an at-risk zone?

Transportation of dangerous goods

Not only are many goods constantly in transit off the French coast, but they include a significant amount of potentially dangerous products. The notion of **potentially hazardous and noxious substances (HNS),** defined by the IMO, covers any harmful chemicals or products that may release harmful chemicals as they break down. This includes substances as diverse as mineral acids (sulphuric acid), compounds derived from petrochemicals (toluene), metal salts (zinc sulphide) and food products that may release harmful products as they deteriorate in water (wheat). Crude oil, petroleum fractions and natural macro-waste (wood) or industrial waste (bottles, plastic bags, etc.), PIBs and Palm Oil do not fall within the HNS category (Girin & Mamaca, 2010).

Hydrocarbon spillage, whether cargo or propulsion oil, is usually easily recognisable, even if the texture or colour of the pollutant may vary. Pollution of this type can be seen and its odour detected. HNSs, however, are more difficult to identify, especially as a multitude of hazardous substances are transported by sea in bulk or in packages (container, tank container, drum). In the case of spillage at sea or on the coast, rapid identification of the product(s) involved favours appropriate protective measures.

Hazardous materials in bulk are transported by specialised vessels clearly identified by the maritime authorities. If one of these vessels is grounded on the coast or in the event of spillage of the pollutant at sea or in the air (toxic fumes), the identification of the pollutant and associated risks is facilitated. This type of event with potentially more serious consequences remains, however, uncommon. On the other hand, the arrival on the coast of drums or containers possibly containing hazardous or noxious substances is much more likely and the inherent risks are more difficult to identify. Indeed, danger labels which, according to international standards, must be affixed to any drum or container carrying chemicals, may have disappeared in contact with seawater.

In order to link potential risks to a given product, hazardous products have been broken down into **nine hazard classes** (IMDG code). When sailing in the Channel, vessels over 300 Gross Registered Tonnes carrying dangerous goods (oil + HNSs) must declare themselves as they sail through the traffic separation systems.

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The MOL Comfort

On 17 June 2013, the MOL Comfort container ship, carrying 4,382 containers, broke in two in the northern Indian Ocean. The rear portion sank a few days later with 1,700 containers and 1,500 tonnes of propulsion fuel. The front part of the ship was still floating. Towing operations to a port on the Arabian Peninsula started while three vessels present in the zone tried to fight the fire, unsuccessfully. The forward part of the ship sank finally, in waters 3,000 metres deep, on 10 July, with 2,400 containers and 1,600 tonnes of fuel on board. In addition to the ecological consequences of these spills, the cost of the loss of the cargo and the ship was estimated at over 400 million Euros, which could have an impact on insurance premiums across maritime transport. Occurring far from the coast, this spectacular shipwreck had little direct impact on coastal communities and will soon be forgotten by many. Yet, what can be learned from this accident? Could a similar sea event happen in the Channel? Without a doubt. Interactions with other activities at sea and with coastal populations would then be considerable.

Dangerous materials declared to the Channel CROSS centres in 2011

Quantities of dangerous goods declared in the Channel French MRCC in 2011 (in thousands of tons)

	Explosives	*Gases*	*Flammable Liquids*	*Flammable Solids*	*Oxidizing Substances & Organic Substances*	*Tox ic & infectious Substances*	*Radioactive Substances*	*Corrosives*	*Miscellanous*	
Classe	**IMO 1**	**IMO 2**	**IMO 3**	**IMO 4**	**IMO 5**	**IMO 6**	**IMO 7**	**IMO 8**	**IMO 9**	**Total**
Gris-Nez	183	18 126	131 087	1 350	574	1 015	21	3 195	3 630	159 180
Jobourg	476	25 344	271 460	3 074	3 948	2 991	23	777	15 242	271 460
Corsen	322	22 210	192 478	3 774	2 873	2 259	23	7 383	11 513	192 478

Source : CROSS Activity Reports 2011

These reporting requirements give a clear indication of the quantities of dangerous substances sailing off the coast of the Channel (see figure above). In 2011:

- 159.2 million tonnes, of which 82% of IMO 3 (flammable liquids, mainly hydrocarbons) were reported to CROSS Gris-Nez
- 323.4 MT of which 84% of IMO 3 were reported to CROSS Joburg
- 242.8 MT of which 79% of IMO 3 were reported to CROSS Corsen

NB: Unlike the other two CROSS, the data of CROSS Gris-Nez include only upward shipping. Downward vessels are accounted for by the British authorities.

Why such an at-risk zone?

Difficult navigation conditions

Shipping conditions vary throughout the World's oceans due to weather (wind, waves, fog and storms), oceanic (bathymetry, type of seabed, currents, tides) and/or anthropogenic conditions specific to each area (shipping density, obstructions to shipping and other maritime activities). Some stretches are well recognised as being more dangerous than others by seafarers. All these factors are correlated to determine the areas where navigation is potentially most at risk, either because of rough sea conditions (ships, put to the test, have a greater risk of damage, undocking, grounding or sinking) or lack of visibility (increased collision and grounding risk) or because of the presence of obstacles. The Channel is an area where navigation is particularly difficult.

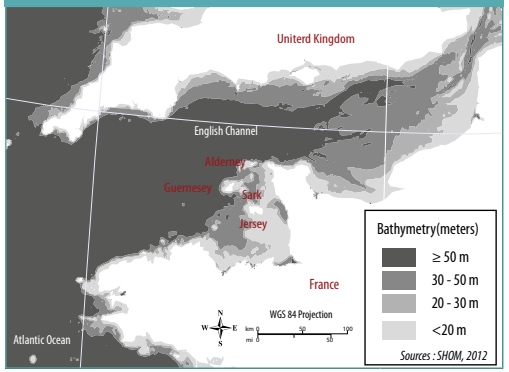
The Channel, a sea bordering the Atlantic Ocean and opening northeast onto the North Sea, is a small epicontinental sea covering only 75,000 km^2. It is a very narrow maritime area. It is 540 km long and its width ranges from 180 km in the western part to 31 km in the Dover Strait. Its depth does not exceed 120 m and is reduced from west to east reaching, at most, only 65 m in the Dover Strait, with some stretches not exceeding 30 m in depth (see map opposite). The danger of these shallow depths is accentuated by the presence of islands, shallows and reefs mainly bordering the French coasts. This geographical configuration induces some of the strongest **sea currents** in the world (see map opposite), combined with strong tidal currents ranging from 5 to 11 metres on average with a maximum of 15m in the Bay of Mont Saint Michel. In the western part of the Channel, swell causes heavy seas on the British coastline and strong waves on the French coast, while in the eastern Channel, wave amplitudes are lower. Over and above the sea event itself, the tide also affects the severity of pollution. Indeed, tidal currents are involved in moving and depositing pollutants, while the tidal range determines the foreshore level reached by pollution.

Prevailing winds in the Channel are southerly and westerly, becoming westerly/south-westerly in winter and westerly in summer. This general pattern is, however, often modified by disturbances from the polar front. A study by Météo France over the period 1973-1997 shows that weak winds (<4 knots) are infrequent, in almost all zones less than 5% of the time and the frequency of strong southwesterly and north-westerly winds increases in autumn and winter. The windiest area is at the Cap de la Hague; winds there are stronger than force 6, all directions combined, almost a quarter of the time throughout the year and more than a third of the time between November and February.

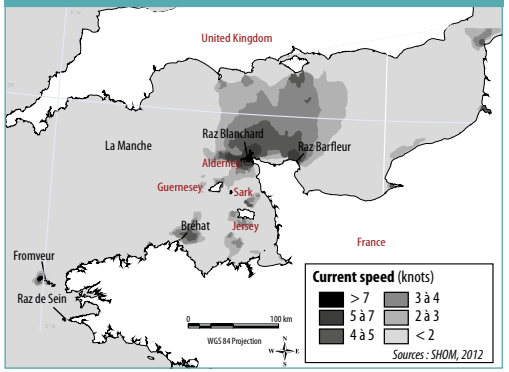
In addition, **fog** is common in the Channel, with an average of more than 20 days of fog per year. This average is even higher between the Belgian border and the estuary of the Seine where radiation fog is common between November and March, especially in smog-covered industrial areas. Driven by a light breeze, this fog can spread over a great distance off the coast. The highest frequency is observed at the Cap de la Hève, near Le Havre. There the average is 52.8 days of fog per year. Advection fog, meanwhile, is especially common in summer (three to five days per month) and often spreads to the coast due to the sea breeze. This type of fog is dangerous because of its speed, as visibility can fall to less than 100 m within minutes. There is also a third type of fog in the Channel, evaporation fog, formed when cold and very stable air covers the sea. If the greatest frequency of poor visibility is observed annually in the Pas de Calais, summer fog is less frequent there than in the western part of the Channel.

In conclusion, **navigation is notoriously difficult in the Channel**. Several areas require special attention. The Ouessant and Les Casquets TSSs suffer from severe meteorological and oceanographic conditions, especially in winter (rough sea, wind, etc.), while the Pas de Calais suffers, among other things, from a frequent lack of visibility.

Bathymetry



Current speed



Storm in Goury, Basse-Normandie, France

Major sea/land exchanges

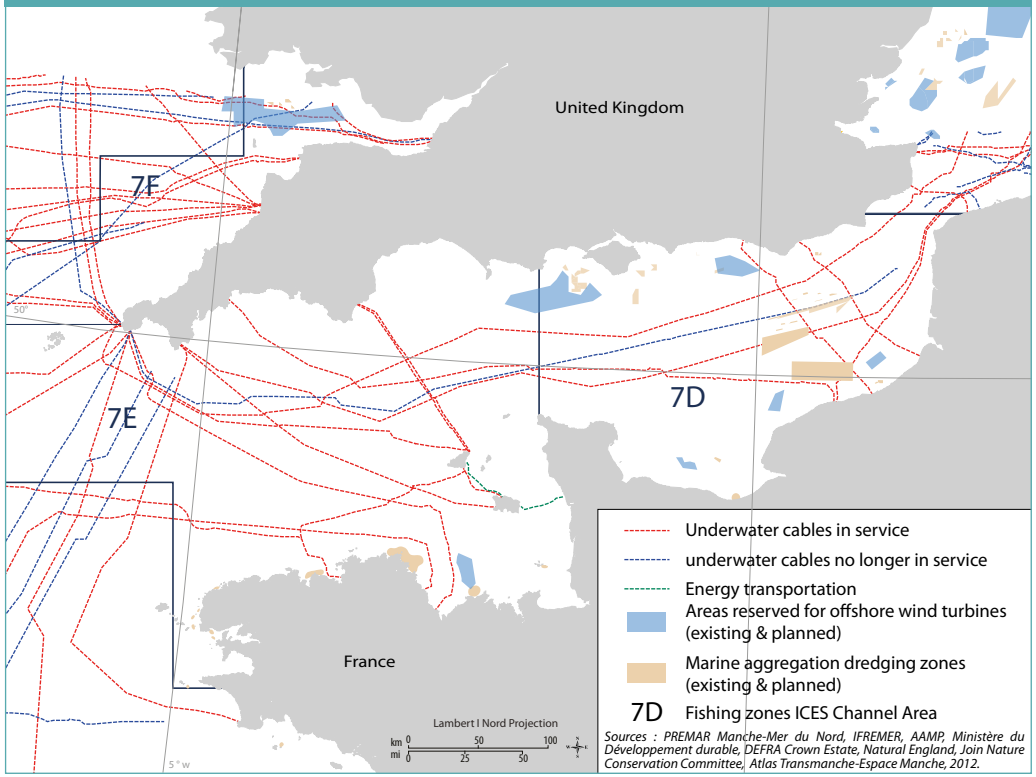
Societies have always colonised the coast - spaces open to other territories - fostering economic, social and cultural exchanges. The Channel area, a link between the British Isles and the continent - is no exemption. The Channel area is an area of ancient and densely occupied settlements bringing together more than 46 million inhabitants.

Activities are carried out side-by-side and jostle for space, squeezed into this narrow coastal strip bordering one of the busiest seas in the world. Fishermen, the merchant navy, the navy, yachts people and tourists are its main users. Increasingly growing numbers of sea activities (submarine cables, aggregate extraction, wind farms and, soon, tidal stream farms, etc.) (see map opposite) are inserted in the middle of maritime traffic and inevitably find their outlet on land.

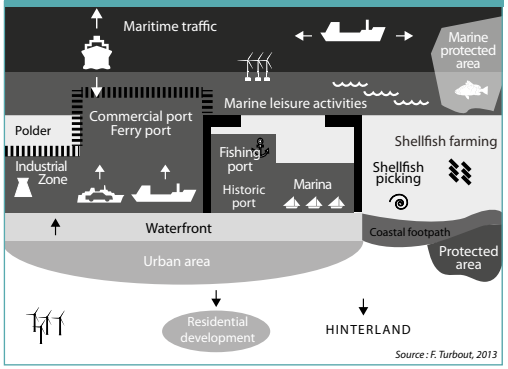
All sorts of activities are carried out along this coastline, including industry (metallurgy, nuclear, refineries, etc.), activities linked to marine resources (breeding pools, oyster farms, food processing industries), farming, shipbuilding and repair and tourist and leisure activities (marinas, spa therapy, casinos, etc.) all of which have a varying impact on an already restricted area. The economic importance of this interface is therefore very strong.

This tension and even competition for maritime and coastal space is exacerbated, especially as the ecological wealth of the Channel highlights the need for conservation. This is why maintaining sometimes competing activities with conflicting objectives is a major challenge for the territory. The coastline of the Channel is therefore an (eco)system, subject to **numerous interactions and interdependencies** (see figure opposite) and whose fragile balance could easily be destabilised by rippling-effect maritime pollution on the ecological and economic wealth of the territory.

Use of the Channel sea



A thriving sea-land interface



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Offshore wind farms

Their development, desired by the authorities to meet the requirements of diversified energy production, generates many constraints that are still unclear. The installation and maintenance of offshore wind farms and their infrastructure will rapidly become a strategic issue. Technical and technological difficulties, operating and access conditions will inevitably impact on operating costs, yields and thus economic performance. To rise to this logistical challenge, significant resources on land and at sea will be required and must be anticipated at the earliest. Indeed, all the components of the support chain will be affected as follows: port infrastructure (docks, handling, buildings, etc.), shipbuilding skills and knowledge, means of access (sea, air), training, expertise and experience of local operators, reception means and conditions, etc. The marking of all this infrastructure is codified in the International Regulations for Preventing Collisions at Sea. Calls for tender for the installation of wind farms in French territorial waters have also been proposed in areas of lesser constraint where the risk of collision is deemed to be lower. In theory, everything has been planned, but monitoring quality on the bridges of ships will then determine safety near the farms.

Endangering of human life

In maritime security, the priority remains the protection of human life. If by that we mean traditionally safeguarding life at sea, protection of coastal populations is not a lesser imperative.

Endangering of the ship's crew

In order to ensure the smooth running of merchant vessels, many international conventions govern staff and crew training as well as safety and security standards: SOLAS, ISM, STCW, ISPS. The verification of these standards is planned at several levels: ship-owner, Flag State and Port State, each in their respective areas. Nevertheless, **the human factor is involved in 75-80% of maritime accidents.** Among commonly observed deficiencies are the lack of training of sailors, their difficulty communicating in English, an incorrect or incomplete log of rest hours and work, lack of familiarity with on-board equipment and incident procedures. On board container ships, the way cargo is handled (inter-reactive substances stored near each other, misrepresentation of container weight causing destabilisation or crushing of stacks of containers) also generates very high risks of fire and explosion.

Endangering of crews of other ships and their passengers.

Besides the risks involved for the crew of the vessel involved, **the interaction with other vessels can be very dangerous.** For example, on 28 August 1999, the container ship **Ever Decent** collided with the **Norvegian Dream** liner, off Dover. Containers fell overboard while a fire broke out on the deck of the merchant ship. Several of the burning containers were filled with cyanide, lead and pesticides causing both an explosion and chemical pollution. The release of toxic fumes forced firefighters to operate with caution. The consequences of the accident were ultimately limited. The passengers of the liner were not endangered and the **Ever Decent** was allowed to sail to the port of Zeebrugge for repair.

Whether involving crew or passengers, **rescue at sea, especially of injured persons, is always a difficult operation.** However, in an area where maritime traffic is as dense as it is in the Channel (see map above), when a ship is in trouble, interaction with other ships is never far away.

Endangering of coastal populations

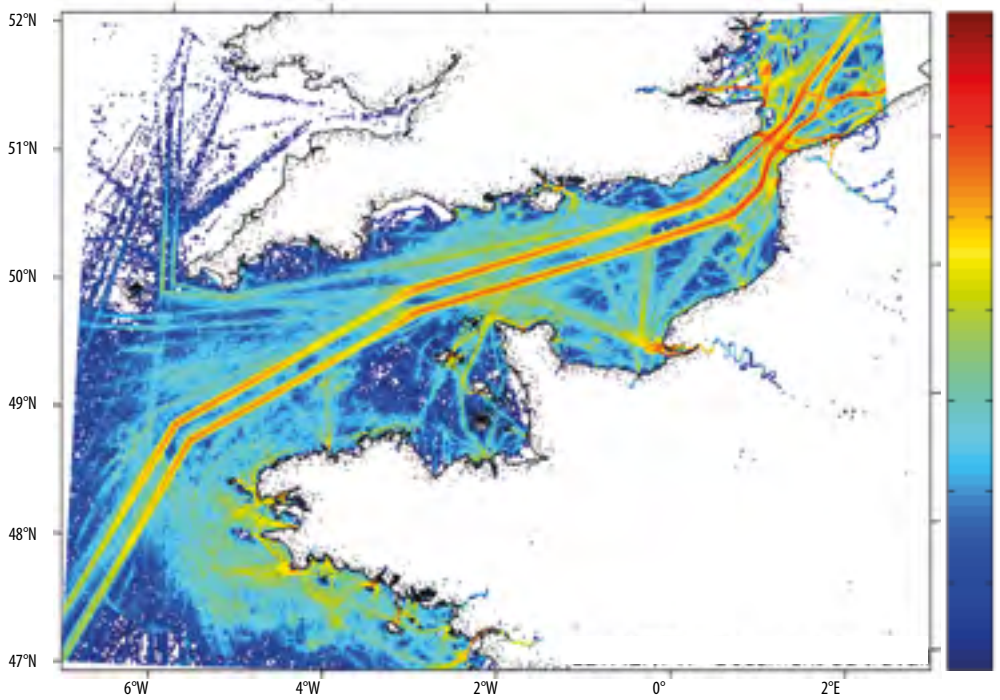
Coastal communities are not spared by these risks in cases of:

- toxic fumes caused by fire on board
- explosion if the ship is close to the coast or even in a port (with the risk of a domino effect on the port facilities)
- dangerous pollutants reaching the coast (container, drum or bulk)

The diagnosis established by the maritime authorities within the framework of proceedings to accommodate a ship in difficulty admittedly takes into account the risk to the population. However, the grounding of the ship or other hazards in the immediate vicinity of the coast do not always give maritime authorities the opportunity to tow the ship away from the coast and inherent risks to the population. It is essential that the terrestrial authorities include these possibilities in their contingency plans to **anticipate any necessary evacuation or confinement measures.**

Maritime traffic density in the Channel

Number of ships per day identified in the English Channel in August 2012



Source : CETMEF / PTI, Envisia, Working paper, 2013

© Marine nationale

Environmental damage

The length of the Channel coastline, including both sides, is over 5,500 km long with a wide variety of landscapes, low-lying coast, with a variety of cliffs forms. In general, coastal areas are ecologically rich both in terms of flora and fauna. A number of national, European and Global designations identify the richest and most vulnerable sectors. The localisation and, in most cases, the overlapping of these classifications, provide a useful indicator for determining ecological sensitivity (see map opposite).

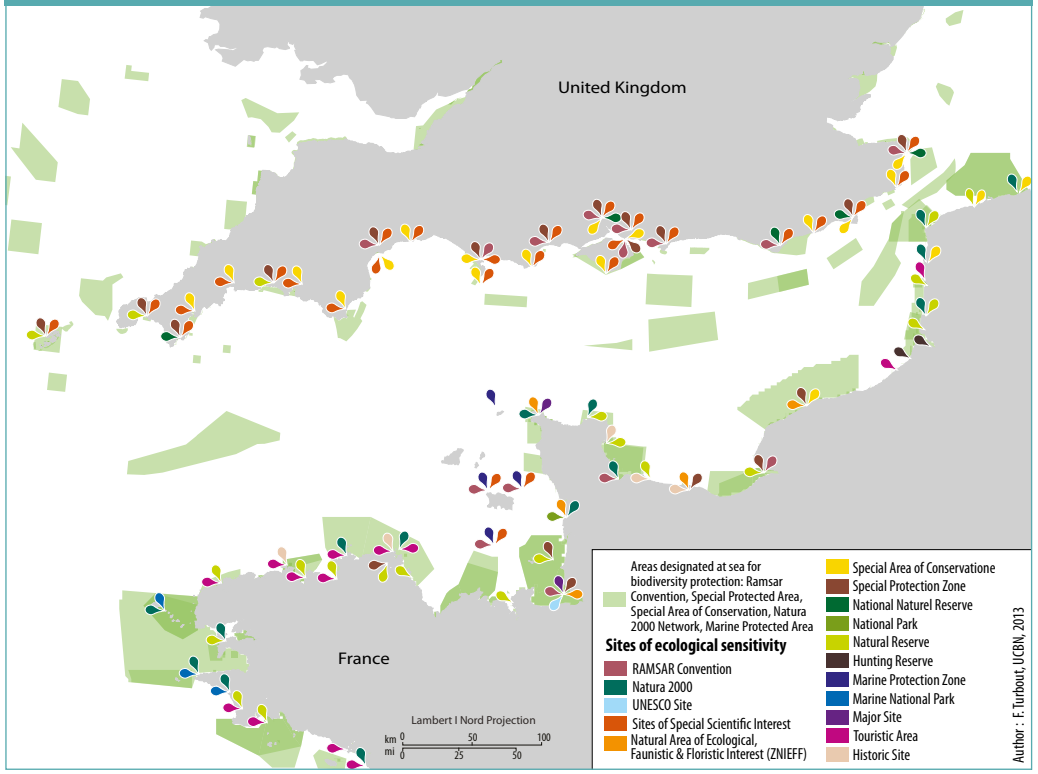
Coastal management has to **reconcile the requirements of conservation and development.** The French and English coasts, and the sea that separates them, are under constant pressure. Some environmentally sensitive sites are protected, while others have been chosen before classification into sensitive areas for the implementation of activities with potentially damaging consequences for the natural environment. This is the case for nuclear facilities, located on the coast for easy cooling of reactors by seawater. In the case of pollution, the media image of birds covered in oil often distracts from other key environmental issues. Thus, in the northern zone - Pas de Calais - Somme, authorities have decided to give protection priority to the following: Gravelines nuclear plant, commercial ports (Dunkirk in particular) and the Channel estuaries

This prioritisation does not at all express a disinterest for the natural value of the areas in question. It is all due to security and population protection (plant cooling), economic (port activity) and technical reasons (it is easier to deploy a barrier at the entrance of a port rather than in an estuary).

The consequences of maritime pollution on the natural environment vary depending on the nature of the pollutant and the affected coast. The more the coast is exposed to the hydrodynamics of the sea, the more it will be able to self-clean and the more effective cleaning techniques will be and easy to implement. Thus, in general, rocky coastlines and beaches are less vulnerable than mudflats and marshes. Impacts on fauna (seabirds, fish, invertebrates, crustaceans, etc.) and flora are diverse and can affect the whole food chain. A reduced occurrence of one or more species or biological community can cause an imbalance in the ecosystem in the short to long term.

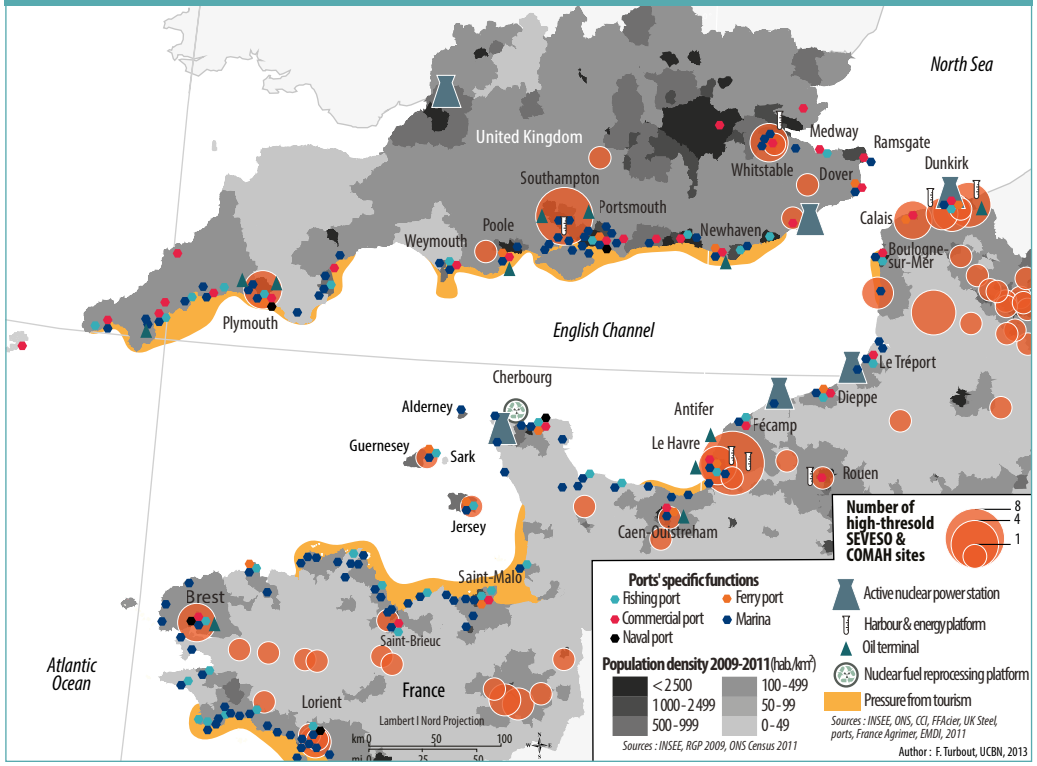
More specifically, **the effects of maritime pollution on many species of fish, crustaceans and molluscs** found in the waters of the Channel are direct when it involves a spill or death, which can be immediate or delayed in time. The most vulnerable species and biological communities are those with reduced or even non-existent mobility including less-mobile molluscs such as scallops, fixed molluscs (oysters and mussels) and certain crustaceans. Mortality can occur by ingestion or suffocation, with varying degrees of vulnerability in juveniles or adults. Pollution also has indirect effects on reproduction and thus the survival of the species in the event of destruction or alteration of spawning grounds where adults come to breed; these areas are spread generally, over big areas. The breeding season, which can vary from a few weeks to several months depending on the species, is thus a particularly critical period due to the regrouping of adults, especially as pollution can disrupt their reproductive capacity. Nursery areas, usually coastal and estuarine, where juveniles will grow, are also highly vulnerable insofar as juveniles remain several months or even years in these sites. Maritime pollution also disrupts the food chain. The depletion or disappearance of benthos and pelagic prey will deprive predators of all or part of their diet.

Ecological vulnerability of the Channel coastline



Economic consequences

Highly anthropised coastlines



Over and above pollution-fighting operations, maritime pollution can disrupt the economy of an entire region. **Many activities exist alongside each other on the shores of the Channel including ports, industries, services, recreational activities, etc**. In the case of pollution, the extent of the economic impact will be measured by the degree of interaction between land and sea activities: impacts may be direct or indirect.

All the Channel ports, whether merchant, passenger, fishing, recreational or military (see map opposite), may see their activities prevented by pollution. Even if vessels are not polluted directly, they need to remain in port, unless they themselves, participate in pollution-fighting operations at sea (fishing vessels in particular). Pollution will also hamper their activities on the water (fishing, sailing, nautical activities, etc.). In the longer term, pollution will harm the image of the area and probably lead to a decline in tourism for a length of time depending on the severity of the pollution and its media coverage and in an area going well beyond the zone actually polluted.

Pollution may also affect the integrity or proper functioning of certain onshore facilities, located in the coastal, port or estuarine area. All installations with sea water intakes may be disrupted. For tourism (tidal bathing facilities, aquaria and seawater therapy), health (rehabilitation centre) or research activities, the consequences will be damaging but not dangerous. However, the risk posed to the health of coastal communities by some pollutants can be very serious. Sites where this is considered to be a risk or covered by the SEVESO and COMAH regulation in France and the UK , respectively. There are 115 on the French side and 21 on the English side, mainly concentrated in the Nord - Pas de Calais, Seine Maritime and in Hampshire, near the ports of Dunkirk, Le Havre and Southampton. Their concentration in the same areas (industrial & port complexes) increases the danger because of the risk of a domino effect. If a shipping incident were to occur in the vicinity of a nuclear power station, this may result in the need to shut down the seawater based cooling systems. If this occurred there could be significant effects on the national grid. The juxtaposition of nuclear installations and busy shipping lanes needs to be considered carefully.

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Fishing and marine aquaculture

In the case of pollution, the alteration of sensitive habitats (spawning and nursery) has a negative impact on the stock of species and is especially damaging if the stock status is already precarious. Dwindling food resources drive away those species that are able to leave. They will then increase predation in areas already visited, thus strengthening competition for food. In addition, fishing and shellfish farming may be prohibited, resulting in either a transfer to non-polluted areas, thus increasing competition between fleets or a cessation of activity if vessels cannot move to other fishing and landing areas. The sudden loss of a shellfish farm has long-term consequences since sales may only commence several years after the introduction of young individuals into the environment. Pollution also poses the risk of consumer mistrust towards seafood and therefore a fall in demand, resulting in a drop in activity and a decrease in the profitability of farms.

The international and European scope

In order to regulate and secure human activities at sea, maritime states have gradually developed international conventions and regional agreements. **The United Nations Convention on the Law of the Sea** (UNCLOS) was developed by the International Maritime Organisation (IMO) adopted on 10 December 1982 in Montego Bay and applicable as of 1994, sets out the main principles of international law in terms of delimitation of maritime zones (inland waters, territorial sea, contiguous zone, exclusive economic zone - EEZ and high seas) and regulations applicable to each of them. NB: To be enforced, international regulations must be ratified by the States and transposed into domestic law, which explains the sometimes long delays between the adoption of a Convention and its entry into full force in a State. Since the 1960s, this dense regulatory framework has often been built in response to a maritime disaster: CLC/IOPC, Marpol, ColReg, Erika packages including the creation of the EMSA, etc.

Over and above this general framework, **other conventions and regulations** relate more specifically to maritime safety. These have been grouped together according to three broad categories: prevention, intervention and reparation. Many areas are covered and many regulations will come into play in all three phases of pollution depending on the type of ship, the nature of the cargo, potential risks, etc. The main challenge is not to create new standards but to enforce existing ones. This difficulty in implementation is explained both by a lack of control by the various maritime authorities (classification company, Flag State, Port State) and the willingness of shipping stakeholders to reassure themselves in order to guard against disasters. Thus, for compensation for damages, if **the principle of "polluter pays"** seems self-evident from a theoretical point of view, it may be difficult to apply in practice because there are many types of shipping stakeholders (owner, charterer, loader, etc.) and their specific responsibilities are not always clear.

The *Tricolor* cutting and raising operations

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Role of the European Maritime Safety Agency

The EMSA was established by the European Union in 2002 to strengthen the efforts of States in the field of maritime safety. In terms of prevention, it supports control of the Port State and evaluation of classification companies. Its *SafeSeaNet* scheme allows real-time tracking of ships carrying dangerous cargo while *CleanSeaNet* analyses satellite imagery to very rapidly warn a Member State of illegal or accidental discharging of pollutants in its area of competence. In the event of a maritime accident, EU Member States may request the intervention of anti-pollution vessels specially chartered by the EMSA.

The specific features of managing pollution in the Channel

Most maritime incidents in the Channel are likely to involve British and French interests. This is why the maritime authorities of both States planned and agreed **cooperation and coordination procedures in the event of a maritime disaster** to make their intervention as effective as possible. This Franco-British agreement, called the Manche Plan, was first signed in May 1978 and is activated, by agreement, if a crisis arises; all of the stakeholders are on a constant look-out.

The **Manche Plan** concerns the incidents likely to implicate the interests of both States, or when a State is unable to manage a complex sea incident on its own, and needs support from the other State. It is applied in terms of sea search and rescue (SAR), assistance for a vessel in distress, tackling of pollution of any type and management of disrupted traffic (CIRC). The Manche Plan is **a bilateral technical agreement implementing the Bonn Agreement.** The Channel is split by a separation line determining the zones of responsibility between the two States. A sub-region of responsibility has been defined 12 miles around the Channel Islands (see map opposite).

Coordinating the intervention involves defining the intervention strategies, mustering and directing the means required for its implementation and giving the latter the necessary information for carrying out their missions. Initial responsibility for the intervention is based on the known or supposed position of the sea incident. The coordination responsibility can then be transferred at any time by mutual agreement. Right from the operation's outset, the maritime authorities ensure that a communication strategy is drawn up together. With respect to tackling pollution, the responsibility transfer decision depends on the States' prerogatives in terms of protecting populations and the environment, as well as on the vessel's nationality or the fact that the bulk of the means that are likely to be mobilised belong to the other State.

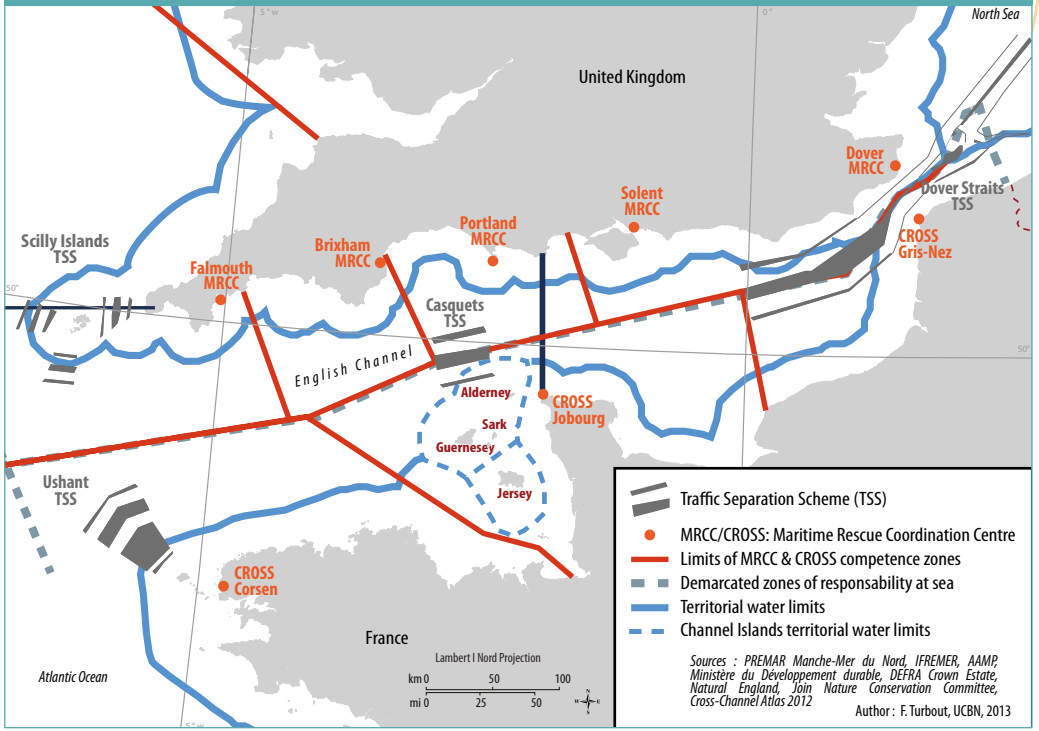
Should a maritime incident occur, the relevant **maritime authority** decides on the strategic options; has authority over **the operational centres**; commands the legal tools and oversees communication. This is the Maritime Coastguard Agency (MCA) for the UK and **Préfet maritime** for France. The operational centres, tasked with coordination and intervention in the sea in accordance with the strategy defined by the maritime authority, are the Maritime Rescue Coordination Centre (MRCC) on the British side and, depending on the type of event, either the **Centres Régionaux Opérationnels de Surveillance et de Sauvetage** (CROSS) or **Centre des Opérations de la Marine** (COM) on the French side.

When a vessel in distress needs accommodating in **a place or port of refuge**, both States look into the accommodation possibilities together, in line with their national procedures, regardless of the position of the ship in relation to the separation line. They base their analysis on the vessel's location, the type of damage it has sustained, its cargo, the changing weather conditions and the characteristics of the potential places of refuge.

Twice-yearly meetings give both countries the opportunity to study accident rates, discuss the regulatory and operational changes and thus adapt the system accordingly. Joint exercises are organised at regular intervals, including an annual SAR exercise called **Manchex.**

In the Channel Islands, it is the British Ministry of Justice that is responsible for managing sea incidents. In this regard, the MCA is their main point of contact. But for reasons of geographic proximity, the search and rescue operations (SAR) within the sub-region may be coordinated by the French authorities at the request of the authorities of the island in question. In the event of pollution, the Channel Islands may ask for assistance from the UK, which coordinates with France to take the necessary support measures.

Offshore responsibility areas



What response operations are conducted in the event of pollution?

The French response

In France, since 2004 organisation of maritime pollution prevention has been carried out **through the ORSEC (Organisation of the Civil Defence Response) system.** This shares out the remit between land and maritime authorities and comprises three levels: maritime, zone and **department** (see figure opposite).

The sea response is conducted by the **Préfet maritime** under the maritime ORSEC system. This is the Director of Rescue Operations (DOS) and, in this regard, he coordinates all of the operations with respect to search and rescue (SAR), hydrocarbon or chemical maritime pollution (POLMAR), maritime nuclear accident (NUCMAR), assistance for vessels in distress (ANED) and disrupted traffic (CIRC). Alerts are received by the *Centres Régionaux Opérationnels de Surveillance et de Sauvetage* (CROSS) which notify the *Préfet maritime* thereof. The response adopted depends on three levels of severity:

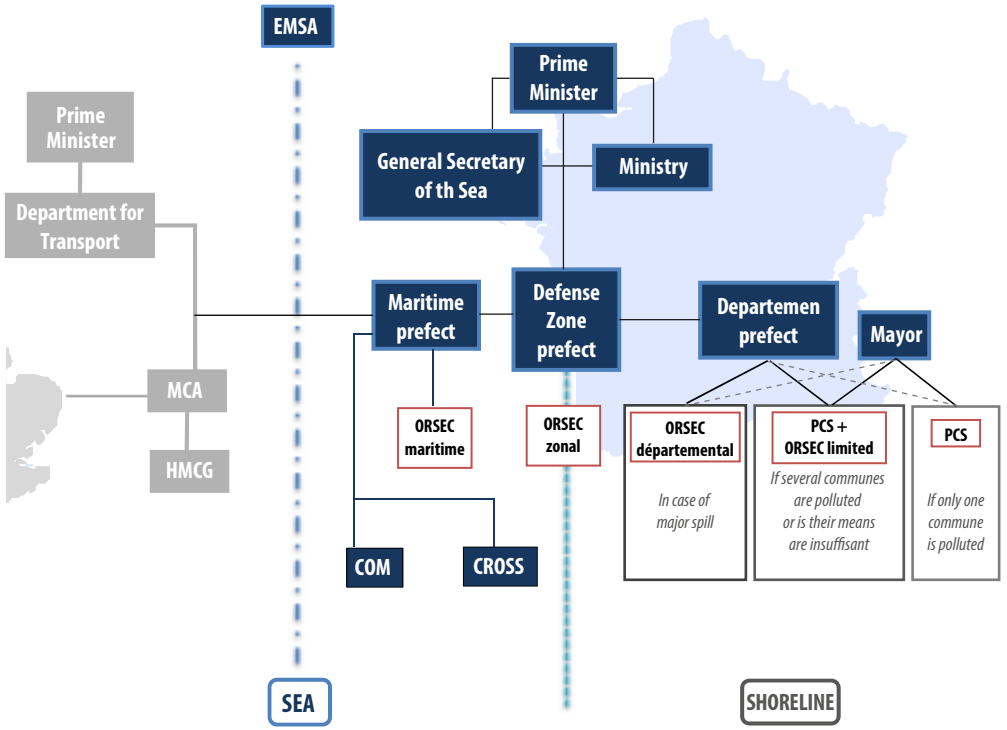
- **Level 1:** The CROSS or *Centre Opérationnel de la Marine* (COM), depending on the case, may tackle the emergency with the usual means available.
- **Level 2:** The CROSS or COM needs to reinforce its organisation to tackle the emergency. An intervention management team is activated to oversee and coordinate the intervention in the sea, in line with the strategy decreed by the **Préfet maritime**.
- **Level 3:** When an incident exceeds the scope of an intervention in the sea, a group of experts is formed by the *Préfet maritime* with a view to advising on the strategic options that will guide the intervention.

Moreover, if he considers it necessary, the *Préfet maritime* may implement the international cooperation agreements making it possible to bring into use wider international support in an emergency (European Maritime Safety Agency, Bonn Agreement, Manche Plan).

On land, coordination of the operations is shared out, depending on the case, between the mayor and the *Préfet*. The mayor must prevent, through suitable precautions, and put a stop to, by distributing the necessary aid, all types of pollution, immediately provide for all assistance measures and, where applicable, involve the higher governmental body. The measures to be taken by the mayor are grouped within a **Municipal Protection Plan** (PCS). In the event of pollution on an exceptional scale, the *Préfet* takes responsibility for the operations (DOS). The mayor must then follow the latter's orders by placing at his disposal the municipality's human and material means. These operations are provided for under the *département* ORSEC system. Lastly, when medium-scale pollution affects several municipalities and/or exceeds the means of the municipality concerned, the *Préfet* may or may not take charge of the operations. If he does not, the mayor's and *Préfet's* prerogatives co-exist within the PCS and a smaller **ORSEC system.**

Land-sea coordination is ensured by the *préfet de zone de défense* (defence zone prefect) under the **zone's ORSEC system.** The latter ensures that the maritime and *département* ORSEC systems are consistent, the supply and distribution of additional means between *départements*, coordinates the operations falling under the land-sea interface and the land-based operations when several *départements* are affected, as well as the financial procedures.

Maritime pollution management in France



FOCUS

Cedre

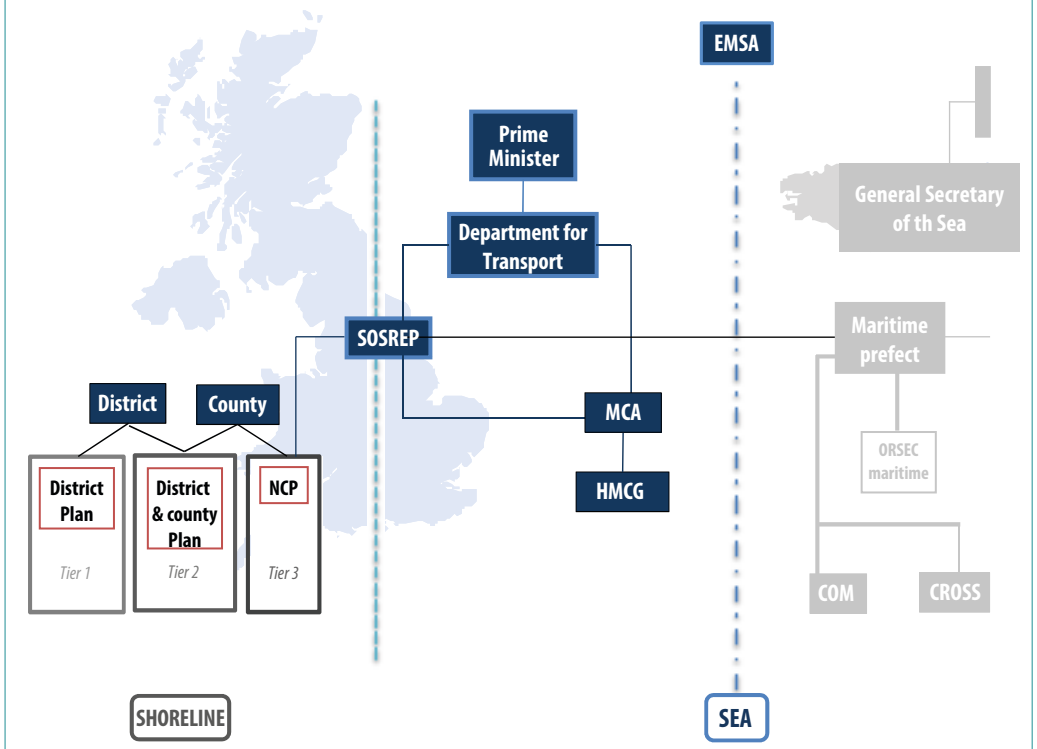
Cedre is an association aimed at improving preparations for tackling accidental water pollution and at reinforcing the French intervention system. At national level, it is responsible for documentation, research and trials concerning pollutants, their effects, and the methods and specialised means used to combat them. If a pollution incident occurs, it provides advice and expertise to the maritime and land authorities.

The British response

It is first and foremost the owners and captains of vessels who are responsible for preventing maritime pollution, as well as the port authorities as regards the safety of their facilities. That said, vessels and port authorities can find themselves in a critical situation that exceeds their intervention capacity. In these cases the **National Contingency Plan** (NCP) is activated and implemented by the **Maritime Coastguard Agency** (MCA) (see figure opposite)

The **Secretary Of States REPresentative for Maritime Salvage & Intervention** (SOSREP), appointed by the Government, is tasked with taking and coordinating all measures aimed at assisting vessel, preventing, reducing and minimising pollution. He is not directly involved in pollution cleanup operations but often will remain involved in an incident and advise on matters or direct these where it is his responsibility.

Maritime pollution management in England



When an alert reaches a Maritime Rescue & Co-ordination Centre (MRCC) of Her Majesty's Coast Guard (HMCG) the Coastguard then notify the **Duty Counter Pollution and Salvage Officer** (DCPSO) of the MCA, who ascertains whether the response already under way (level 1) is sufficient, and determines if a regional response (level 2) or national response (level 3) needs implementing. He is advised on this matter by the Environment Group, which is established locally to the incident, with respect to the environmental impact of the pollution and public health.

To manage **pollution out at sea**, the MCA sets up a **Marine Response Centre** (MRC) in the nearest MRCC to look into and then apply appropriate measures for containing, dispersing or eliminating the pollution, setting the priorities for action in order to protect the sensitive zones and manage the pollution, and monitoring the progress and effectiveness of the measures. It remains subject to any instruction on the part of the SOSREP. The MRC may be run by the MCA, or the port captain if the pollution occurs in a port. The use of dispersants to disperse pollution is common in the UK. The decision to use them is made by the MRC but may only be put into practice once the **Marine Management Organisation** (MMO) has given its approval and advice about how the intervention will be carried out.

Responsibility for leading on **pollution clean-up for the coastline** sits with the relevant local authority. However the co-ordination lead varies depending on its scale.

- **Tier 1 Local**: Considered within the capacity of the local authority or harbour authority.
- **Tier 2 Regional**: Considered beyond the immediate capacity of one local authority
- **Tier 3 National**: Considered to require national resources. The MCA Duty Counter Pollution Officer is consulted and if it is considered necessary an agreed location is identified to implement a Shoreline Response Centre with the support of the MCA. A lead from one of the local authorities affected will be nominated to oversee the co-ordinated pollution containment and clean-up measures.

To ensure the coherency of the system, a liaison officer is tasked with communication between the various Response Centres, especially between the Marine Response Centre and Shoreline Response Centre.

TRUE OR FALSE?

The SOSREP is a major asset in the event of pollution

The SOSREP's ultimate decision-making power in terms of managing a vessel during a maritime accident has proven its operational effectiveness. But for all that, the local authorities feel that this system, which intentionally does not take on board the land interests for the sake of effectiveness, does not respond as well as it might to coastal interests.

What changes are we facing in the future?

Will the sea transport of tomorrow pose fundamentally different risks from those we face today? A brief review of the changes that could take shape over the next 10 to 20 years.

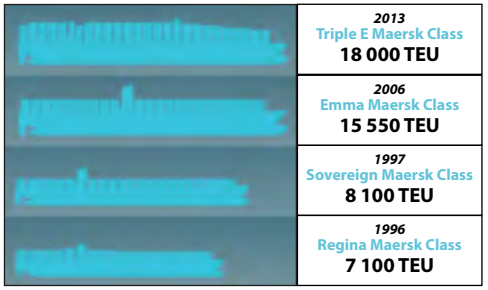
Will the human factor – held responsible in 80% of accidents – change?

The human factor which is involved in many incidents is not frequently taken into account in regulations. The regulations which have been adopted usually focus on the technical side of shipping (phasing out of single hull oil tankers, etc.) and not on the social side (fatigue of seafarers, small number of crew members, etc.). There will not be any radical change in the near future but increasing awareness, particularly at the European level, that the human side should be a key element of maritime safety.

Is the race for ever larger container ships set to continue?

In November 2012, the *CMA-CGM Marco Polo*, with a maximum carrying capacity of 16,020 TEU, became the world's largest container ship (see figure opposite) ... before being overtaken in June 2013 by the Maersk Triple E vessels that have a capacity of 18,000 TEU (see figure opposite). Other companies have since announced that they are building larger ships. But this race is likely to come to a halt before too long. In the same way as the ULCCs (Ultra Large Crude Carriers) have never got near the million tons announced in the late 1970s, technical, port and financial restrictions will probably also draw the line at a certain container ship size. The dangers that increase as size of ships of all categories increases are already a reality and solutions will not be possible for a number of years yet. The dangers associated with faster ship speeds have been limited by the rising cost of fuel – illustrating the dominance of the economic factor over any other consideration. Ships masters therefore slow down their vessels to cut fuel consumption as well as for safety reasons in bad weather or in narrow maritime lanes.

Trends regarding the size of Maersk container ships (1996-2013)



Source : www.worldslargestship.com

Will maritime traffic get heavier still?

The resolve to reduce the carbon footprint of transport has led to the transfer of transport means by road – to the sea. Short-sea-shipping is therefore going to increase. The main commercial ports will become distribution hubs that will redistribute goods towards the regional ports. As such, a Caen-Le Havre line, dedicated to containers, will shortly be up and running and several regional ports are studying the opportunity and potential of new links. Even if these new logistical plans are still not the norm, they may become so (especially if given impetus by legislation). Furthermore, the likely reduction of fishing flotillas will lessen conflicts of use and decrease the risks of forced manoeuvres and collisions. On the other hand, global warming and the North-East passage between North Europe and Asia should only have very slight repercussions for maritime traffic in the Channel in the short- and medium-term.

Is hydrocarbon carriage really safe?

The measures taken after the *Erika* oil tanker disaster led to a decommissioning of the most dilapidated tankers. And yet no one knows how double hull vessels will be serviced. A stabilisation of traffic should be expected in the future, with political bodies advocating the penalisation of this high greenhouse gas emitting energy source. But for all that, the main risks will not go away; number and qualification of crews, flags of convenience, classification societies paid by ship owners, insurers freed from liability, etc.

What is more, although only some ships transport hydrocarbons as cargo, ships transport fuel for their propulsion. Over and above the risks incurred by the loss of containers, all maritime accidents therefore pose a risk of hydrocarbon pollution. Lastly, with this type of vessel, a single accident can require a response to several types of pollution at the same time, thus reinforcing the prevention constraints.

Issues of shipping for tomorrow

Is the control of dangerous goods carriage satisfactory?

The expansion of the chemical industry is leading to a steady increase in international trade. The threat will therefore continue to mount, thereby exacerbating the health risks of crews and coastal populations as well as natural and biological resources. The risks incurred by gas tankers have thankfully been controlled for the time being. Concerning chemical tankers (bulk product), accidents have not had devastating consequences to date. The carriage of dangerous goods by container ships may be more problematic.

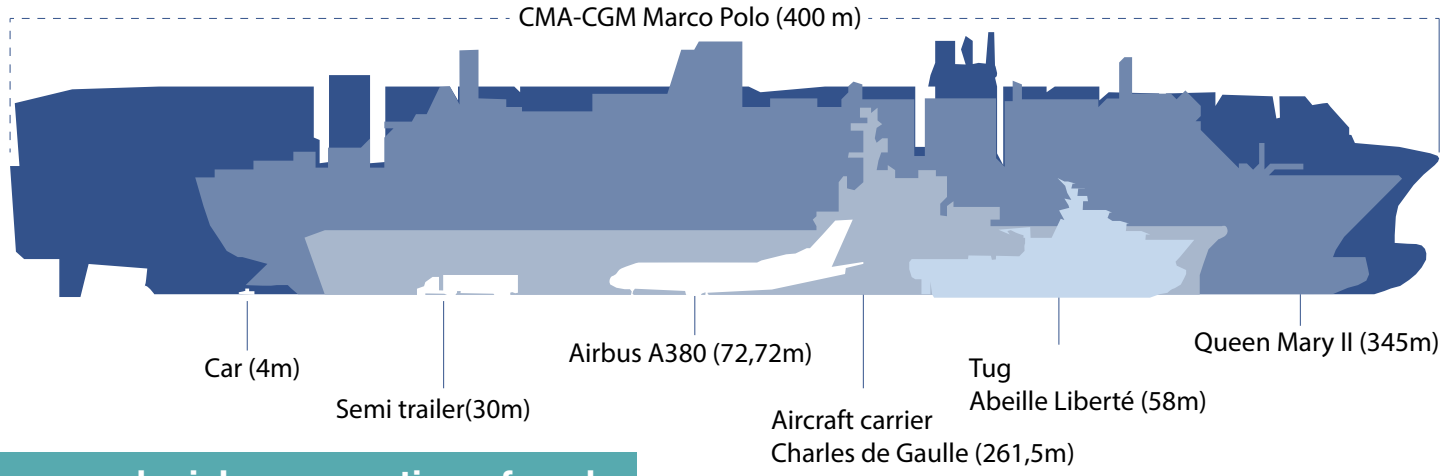
What impact will the generation of new energy sources have on the sea?

The offshore installation of wind turbines and tidal turbines will intensify, but their locations should not constitute major obstacles for maritime transport likely to significantly increase pollution risks. Nevertheless, their consequences in terms of obstacles to navigation and rescue operations have not yet been sufficiently assessed and research will be necessary to measure the actual effects of their installation.

The *MSC Napoli* towed by the *Abeille Liberté*

Conclusion

Generally speaking, the problems of tomorrow will be virtually the same as those we are encountering today. Only their scale will change. Following on from the 20th century, maritime transport in the 21st century will become ever more competitive, with the adjustment variables being the cost of manpower, the condition and servicing of vessels and compliance with the regulations. Serious breaches of the safety standards and failure to apply the polluter pays principle require continuing vigilance in terms of protecting human life out at sea and protecting the marine environment and their consequences for coastal communities. Danger is never far away in the world of maritime transport and disasters can never be predicted. It can be argued that even the **Prestige** did not trigger the ultimate ecological disaster. **The unfortunate certainty is that Channel coasts will experience another major incident and it not 'if' but 'when.'**



Tomorrow's risks: a question of scale

Source : Adapted from www.cma-cgm.fr

Are we prepared to deal with these risks?

A misleading perception of risk

Coastal populations of the Channel, as well as stakeholders involved in a crisis, are aware that there is a theoretical risk of marine pollution. Some areas have a more vivid awareness than others, mostly because of the memory of past spills. However, integrating this risk into everyday life is not easy and many misconceptions are often cited: ranging from "It happened a long time ago, it's not going to happen again" to "This has never happened here, so we'll be spared" and to the superstitious "Keep fingers crossed..." These seemingly harmless ideas can have damaging consequences when they circulate among decision-makers, since they will dictate the means to be implemented to deal with such events. And those very resources allocated to the preparation and management of maritime pollution have been reduced in recent years on both sides of the Channel. On the British side: the end of the chartering of tugs including the iconic co-chartering with France of the *Anglian Monarch* in the Dover Straits, the sharp decrease in the number of public sector jobs, etc. On the French side: notable decrease in the number of civil servants; transfer of powers to territorial authorities, etc. This reduction of human, material and financial resources is alarming. And it is feared that authorities will focus on what they know, i.e. preparing procedures for oil spills instead of innovating in the fight against chemical pollution.

© Marine nationale

Interesting initiatives

In order to promote effective consideration of risks induced by maritime transport, many organisations develop initiatives to educate and assist people and policy makers.

In the UK, the **Coastal Special Interest Group (SIG) of the Local Government Association (LGA)** aims to defend the interests of coastal and estuarine populations by increasing awareness and promoting debate on environmental, economic and social issues of the maritime world. In collaboration with other organisations, it strives to ensure that the necessary measures are taken to manage effectively these issues.

In France, *Vigipol* is a mixed agency created after the *Amoco Cadiz* oil disaster in 1978, which today includes the coastal authorities of Brittany. It carries out prevention, preparedness & crisis management and reparation missions for coastal authorities facing risks from maritime transport, while promoting the development of similar structures in other regions.

In Haute and Basse Normandie, the Conservatoire du Littoral develops a ***"Marine pollution and coastal" network,*** consisting of coastguards, officers working for local authorities or associations throughout the coastal area. In the course of their duties, these officers monitor the coastline. In the case of pollution, they alert, perform operational reconnaissance missions of contaminated sites and offer their pollution removal advice (expertise on the natural environment, cleaning techniques, available resources, etc.) to elected officials and government services.

Moreover, within the POLMAR Terre scheme, government services organise and finance training for local authorities on anti-pollution techniques and strategies. These courses are implemented at the *département* level by POLMAR agents and are usually associated with exercises requiring the close involvement of local authorities and maritime professionals.

FOCUS

MANCHEX exercises

Under the Manche Plan, a Franco-British shipwreck rescue exercise is organised every year between the MCA and the *maritime prefecture* of Manche-Mer du Nord. Regularly, the exercise scenario involves interaction between a passenger ship and a merchant ship carrying hazardous materials. It involves either a collision between ships or a ferry crossing toxic fumes, resulting in both cases, in a large number of casualties and pollution. The recurrent nature of this type of exercise confirms the likelihood of this type of accident in the Channel while stressing maritime authorities' willingness to practise management of such situations.

Proposals

In March 2013, as part of the CAMIS project, thirty or so French and British local authorities supported a declaration of intent in which they recognised the importance and value of the Channel, its coastline, its environment and its economy. They decided to work together to protect the Channel and its population from the risk of maritime pollution. Together they will act to minimise the threat of pollution caused by maritime transport, improve understanding of the risks and encourage change at political and legislative levels.

This joint declaration is expected to take shape through awareness operations, experience swapping and lobbying at national, European and international levels.

1

Defending the interests of local communities and the populations they represent against the risk of marine pollution by lobbying for legislative and political change.

- Getting closer to existing organisations already working in this direction with European institutions (Parliament & Commission) and international institutions (IMO, IOPC, etc.), like the CPMR (Conference of Peripheral Maritime Regions).
- Identifying major improvements to promote as a priority, such as the creation of a compensation fund for pollutants other than hydrocarbons.

2

Conducting studies on the risks of maritime activities in the Channel area and their implications for environmental conservation, economic development, prevention and management of maritime pollution

- Pooling and sharing existing studies.
- Establishing an analytical framework for assessing the potential consequences for local authorities and maritime and coastal activities of a maritime accident in the Channel.

3

Informing elected officials on the Channel coast about the risks of maritime pollution and how best to prepare to manage such events

- Continuing publications and seminars to raise awareness.
- Relying on existing networks of local authorities: ANEL, AMF, ADF, ARF on the French side & LGA on the English side to disseminate information.

4

Training local elected officials and relevant personnel

- Developing experience swapping in specific topics through regular training sessions in connection with organisations that already hold them.
- Developing e-learning.

5

Seeking greater involvement of local authorities by government departments (French side) and local government (English side) in case of pollution by ensuring that appropriate communication channels are established and used by the national and local maritime authorities

- On the French side, strengthening existing POLMAR training in coastal départements by thematic annual meetings.
- On the British side, organising meetings between councils, the MCA the SOSREP and other government agencies to make them aware of local authorities' needs and of local interests.

6

Strengthening Franco-British cross-Channel cooperation in maritime safety, prevention and management of maritime pollution

- Requesting an overall assessment of resources needed to ensure maritime safety in the Channel.
- Ensuring that maritime authorities have indispensable nautical and monitoring resources to implement rescue and pollution-fighting missions by reinforcing Franco-British pooling opportunities.

Table of Acronyms

AAMP
Agence des Aires Marines Protégées - Agency for Protected Marine Areas

ADF
Assemblée des Départements de France - Association of French Departments

ANED
Assistance à un Navire En Difficulté - Assistance for Vessels in Distress

ANEL
Association Nationale des Élus du Littoral - Association of French coastal elected members

ARF
Association des Régions de France - Association of French Regions

BC Code
Code of safe practices for solid Bulk Cargoes

CAMIS
Channel Arc Manche Integrated Strategy

Cedre
Centre de documentation, de recherche et d'expérimentations sur les pollutions accidentelles des eaux - Documentation, research and experimentation centre on accidental water pollution

CIRC
Procédures relatives à la gestion de la CIRCulation perturbée - Procedures relating to the management of disturbed CIRCulation

CLC 92
1992 Civil Liability Convention

IMDG code
International Maritime Dangerous Goods

ColReg
International Regulations for Preventing Collisions at Sea (Collision Regulation)

COM
Centre Opérationnel de la Marine - Navy Operational Centre

COMAH
Control of Major Accident Hazards

CSC
Convention for Safe Containers

CROSS
Centre Régional Opérationnel de Surveillance et de Sauvetage - Regional Operational Centre for Surveillance and Rescue (=MRCC)

DCPSO
Duty Counter Pollution and Salvage Officer

DEFRA
Department for Environment, Food and Rural Affairs

DOS
Directeur des Opérations de Secours - Director of Rescue Operations

EEZ
Exclusive Economic Zone

EMDI
Espace Manche Development Initiative

EMSA
European Maritime Safety Agency

TEU
Twenty-foot equivalent (standard size containers)

EWEA
European Wind Energy Association

FFAcier
Fédération Française de l'Acier - French Steel Federation

IOPC
International Oil Pollution Compensation Funds

GRT
Gross register tonnage

HMCG
Her Majesty's Coast Guard

HNS
Hazardous & Noxious Substances

IBC
International Bulk Code (International Code for the construction and equipment of ships carrying dangerous goods in bulk)

Ifremer
Institut français de recherche pour l'exploitation de la mer - French research institute for exploitation of the sea

IGC
International Gases Code (International Code for the construction and equipment of ships carrying liquid gases in bulk)

INSEE
Institut National de la Statistique et des Études Économiques - French Statistical and Economic Survey institute

ISM
International Safety Management

ISPS
International Ship and Port Security (ships and port security code)

LGA
Local Government Association

LLMC
Convention of Limitation of Liability for Maritime Claims

LL 66
Load Line (international Convention on Load Lines)

Marpol
Marine Pollution (International Convention for the prevention of pollution from ships).

MCA
Maritime Coastguard Agency

MRC
Marine Response Centre

MMO
Marine Management Organisation

MRCC
Marine Rescue Coordination Centre

NCP
National Contingency Plan

NUCMAR
Maritime Nuclear

IMO
International Maritime Organisation

ONS
Office National des Statistiques - French statistics agency

OPRC
Oil Pollution Preparedness, Response & Co-operation (International Convention on Oil Pollution Preparedness, Response and Cooperation)

ORSEC
Organisation de la Réponse de Sécurité Civile - Organisation of the Civil Defence Response

OSPAR
Convention for the protection of the marine environment of the North-East Atlantic

PCS
Plan Communal de Sauvegarde - Municipal Protection Plan

POLMAR
Maritime pollution

ppm
parts per million

Premar
Préfecture Maritime - Maritime Prefecture

RAMSAR
Convention on Wetlands of International Importance

SAR
Search And Rescue

HNS
Hazardous & noxious substances

SOLAS
Safety Of Life At Sea (International Convention for the Safety of Life at Sea)

SOSREP
Secretary Of State's Representative for Maritime Salvage and Intervention

STCW
Convention on Standards of Training, Certification and Watchkeeping for Seafarers (international convention on standards of training, certification and watchkeeping for seafarers)

TSS
Traffic Separation System

ULCC
Ultra Large Crude Carrier

UNCLOS
United Nation Convention on the Law of the Sea

UNESCO
United Nations Educational, Scientific and Cultural Organization

ZNIEFF
Zone Naturelle d'Intérêt Écologique, Faunistique et Floristique - Natural Area of Ecological Interest, Fauna and Flora

ZPS
Zone de Protection Spéciale - Special Protection Zone

ZSC
Zone Spéciale de Conservation - Special Conservation Zone

Further reading...

Websites

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C**ross-Channel Atlas:** http://atlas-transmanche.certic.unicaen.fr/en/

Vigipol: www.vigipol.com

Cedre: www.cedre.fr

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This project has received a grant from the ERDF through
the European Interreg IVA France (Channel) - England programme.